

# COAL AGE

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## Breakers Ahead!

**I**T is about time that some of the lookouts in the coal-mining industry shouted a warning: "Rocks ahead!" In a half-dozen states today, legislative programs have been proposed, which, if enacted into laws, would paralyze the coal business.

This is no time to sit idly in our hammocks and smoke the pipe of peace. The industry as a whole is asleep. The most it has done in years is to wiggle a toe or bat an eye when some "Idol of the People" has jabbed a harpoon into its anatomy.

Supposing all the citizens in Ohio knew that the "Green" bill, which seems about to pass the legislature of that state, is a measure that eliminates all premium on skillful mining. Under this act the men can shoot the coal to atoms if they please, and they will do this if the bill becomes a law.

Talk of conservation—can anyone conceive an act more inimical to all that the term means? Miners as a whole are as decent, as careful, and as intelligent as any other class of labor. But they are working for dollars, not fun, and when they are paid as much for dust as for lump coal, they will let explosives do the work, regardless of the quality or size of their product.

We stake our reputation that the result will be as follows: The percentage of slack coal will increase from 10 to 30 per cent, and the large sizes will decrease that same amount. The price of lump coal to the consumer will advance materially. More timber will be needed; more lives will be lost and general operating costs will increase.

If the miners of Ohio want more money for their labor, and can prove the justice of their claim, let them get it in some other way.

The "Green" bill is a step backwards, and in the end will not add luster to the fair name of coal mining in Ohio. The citizens will hold Mr. Green and his colleagues responsible when it becomes evident to all that the consumer has to pay the added freight.

Glance for a moment at Arkansas and Oklahoma, where, in addition to being shot from the solid, the coal is paid for on a mine-run basis, such as is suggested in Ohio. Since the law went into effect, screenings have gone up from 30 to 55 per cent. of the total output, and the price of lump coal has increased nearly 70 per cent.

Fortunately the solid-shooting law in Oklahoma has just been replaced by a bill recently enacted and to become effective July 1, which forbids any more coal to be shot unless it is first undercut. Legislation, some years ago, resulted in placing Oklahoma a decade behind Ohio in common mining practice. Proposed new legislation in Ohio may reverse the order of the two states.

Coal Age has always maintained its absolute independence and has based its every action on what seemed fair to miner and operator alike. We have never violated our belief that the industry can make no permanent headway except on lines of unquestioned integrity. Our policy has ever advocated fair wages and decent treatment to the men in return for honest labor.

We have been heart and soul with the miners in many of their fights for better conditions. However, in such matters as the "Green" bill in Ohio, and the 200 petty strikes that have occurred in the anthracite field since the recent wage agreement was signed, we question not only the honesty of the men, but the sincerity of President White and the Union officers in the different states concerned.

## IDEAS AND SUGGESTIONS

### Efficiency Improvement through Education

Education in basic principles increases the efficiency of the workman in all other handicrafts and professions, and one would be greatly surprised to learn that coal-mining was outside the scope of its influence.

The arbitrary popular division of industries into those requiring some skill in the manipulation of tools, or the exercise of some degree of mental dexterity in directing their peculiar operations; and those in which it is alleged brute force and a somewhat instinctive action alone are needed in their pursuit, is, of course, a mistaken one, with a mischievous prejudice as the result.

We have yet to be convinced that the skill considered requisite to carve a piece of wood, cut a block of stone along geometrical lines, apply the necessary temperature to the welding of iron, or direct the operations of the machine that reduces pieces of steel to symmetrical proportions, differs in aught else than degree from that necessary to the mining and blasting of a section of a coal-seam, in an atmosphere which may carry a deadly agent, whose detection depends upon the skillful handling of such a delicately adjusted piece of mechanism as a safety lamp.

There are incompetent masons and carpenters, just as there are inefficient miners, men who are a source of concern and loss to their employers, and whose bungling attempts to earn a livelihood are a menace to whole communities.

In either case the predisposing cause, as a rule, is directly traceable to lack of knowledge of a special kind.

From being an industry distinguished by the great simplicity of its operations, coal mining is rapidly being transformed into one of remarkable complexity, and its successful pursuit calls for special knowledge of a wide and varied character on the part of workmen and officials, and a general mental alertness that educational processes in theory and principle alone can provide.

It is no argument against education to aver that many apparently superior practical men have attained marked efficiency without much, if any, assistance from schools or text-books.

The uneducated efficient man does not exist.

Time and again some weak link in the chain of his arduously acquired experience gives way, and exposes his incompetence with terrible consequences to himself and others.

I have wrought alongside many so called practical men who boasted of their independence of theory, and who professed a contempt for book-knowledge. I rarely parted from even the best of such individuals without an opportunity for demonstrating the value of some despised principle, or theory, presenting itself.

It is education and its theories that have enabled the mine-worker to displace the pick with the machine, the wedge with the explosive, the furnace with the fan, steam with electricity, the mule with the motor, the tal-

low-dip with the safety-lamp. It has enabled the miner to raise himself from the degradation of a chattel, through successive grades of improving self-respect, to the position he occupies today, where labor challenges the supremacy of capital, and calls for recognition on terms of equality when issues that affect the destinies of the industry are at stake.

In some mining districts in Scotland there is an agitation afoot to have instruction in the principles of mining incorporated in the elementary schedules of the common schools.

In this matter it is the miners themselves who are moving; and they reason that in a mining community where the majority of the boys must inevitably follow the calling of the mines, many of the principles whose possession will be essential to their efficiency as bread-winners in after years, may be as successfully inculcated at the schoolbench as at the face of the coal-seam.

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### Is the Mine Telephone a Failure?

BY SIM AND WILLIAM H. REYNOLDS

The foreword in *COAL AGE* of Feb. 8, on the mine telephone, or rather on the neglect of the mine telephone generally, should be of universal interest to mining men.

For some unaccountable reason many coal operations try valiantly, if foolishly, to get along without its invaluable aid. It is a safe assertion that not 5 per cent. of the coal mines in the Pennsylvania bituminous regions have telephones in running order. During the past year I have had occasion to visit, in a business way, more than 100 mines in the states of Pennsylvania, Ohio and West Virginia, and I, therefore, speak from observation.

While there are a few modern mines that have not had a telephone system in use at one time or another, in dozens of them only the remains are to be seen today. Sometimes we find that the same official who had it installed has allowed it to disintegrate, but more often a shift in officials is the cause. If it were possible to interview all the foremen and superintendents who have had mine telephones and given them up we would probably find their reasons were: "Out of repair too often"; "Wires broken too frequently by falls"; "Too much moisture"; "Someone fooling with the line all the time." We have the first to find yet who did not acknowledge the great convenience and actual necessity of the system, and we have interviewed many on the subject. But because of one or more of the above reasons the upkeep was allowed to become neglected and final abandonment was the result.

In our opinions the failure of most mine telephone systems is because the management fails to recognize that it must be given the same consideration as a trolley line or a pipeline. If a wire carrying power to the mine is short-circuited or broken, somebody is "on the job" immediately. If a rail is broken or a pipe "busted" or a

pump "bucking," somebody is generally held responsible for getting it into shape again. But pity the poor telephone line; it is usually installed and then left to take care of itself, which is something mine equipment of any sort does not generally do.

Yet this is not because the utility of the system for mine use is not understood. There are too many hours of messenger service, too many bits of quick action can be taken, when quick action means money in the owner's pocket, for its practical qualities to be denied.

Several years ago the foreman of an old drift mine in Ohio found that the main haulage motor was losing a great deal of time because the motorman when in one of his two sections, which were a mile and half in, did not know what the conditions were in the other. Many times the motor waited for loads at one sidetrack while the drivers were waiting for empties at the other. At other times, near the finish of the day, when the motor had barely time to make another trip, the driver would err on the safe side (for himself) and not start in, for fear of meeting the drivers coming out, when if a telephone had been in service he could have notified the trapper at the sidetrack that he was coming. The loss of this last trip at that mine meant a great deal in the cost of the day's output. This was but one phase in the daily work where the need was urgent. The workings being so far removed from where the supplies for the mine were kept, caused a great deal of inconvenience and expense, and was a decided drawback to the proper management of that mine. So the foreman determined on having a telephone system rigged up, as the "made-for-the-mine" outfits were not on the market then as they are today, and the installation of a system which would serve for mine use was largely a matter of ingenuity, and subject to a great many discouragements. This one was no exception, and for sometime was very irregular in its service. Like Finnegan's report it was "Off agin, on agin" quite often. Sometimes a little fall would break the wires; at other times somebody would twist them together just for pure oneryness, and, on one occasion someone, evidently thinking the batteries were not strong enough, ingeniously connected a fine wire to the trolley line and "burned her up!"

But the foreman of that mine stuck to it, and finally placed the entire responsibility of keeping it in running order on a certain employee. He had that man make an examination of the entire line every morning, and *on foot*. And that system is in good use yet, though it has never consisted of anything more complex or expensive than the ordinary wooden case as used on the surface, protected from the mine air by a large box made by the mine carpenter, the latter being heavily coated on the inside with pitch, and covered on the outside with tarred roofing paper. The outfit consisted also of a good tight-fitting door, with ordinary steel wire for the line.

Aside from its advantage as a business proposition in the equipment of a mine the utility of a telephone system as a safety device can hardly be overestimated. This service alone should impel mine managers to install the 'phone. Instances innumerable are recorded where not only have accidents been avoided but relief brought more promptly when they did occur, and much valuable time saved when minutes meant both dollars and life. One instance we recall at a mine in West Virginia, where the man in charge had installed a telephone from the engine

room at the shaft into the workings two miles underground.

A driver was injured by getting his head between a mine car and a post, and rendered unconscious. His fellow workmen notified the superintendent on the surface, who in turn called up the hospital two or three miles distant. As a result the hospital ambulance was on the spot before the injured man reached the shaft top, and within an hour of the accident the victim had received expert attention just in time to save his life.

Another instance we recall of a large mine fire in one of Pennsylvania's largest mines. A gas feeder was ignited as the machine cut into it; ordinary methods of fighting it proved futile, and flames were soon rolling back yards from the face. The mine telephone was put into action and the manager on top hurriedly decided to borrow a thousand feet or so of hose from the local fire department, and rushed it into the mine on a motor. Connection was made to a large pump line and the fire put out before it had a chance to get the entire section, if not the whole mine going.

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## Coal Prices at Suez and Panama

In a review of investigations by the United States as to the supply and relative cost of coal on the Suez and Panama routes to the far East, the *Manchester Guardian* notes that American and British coal will be brought into sharp competition, and prices at the coaling stations will, in many cases, determine whether the new or the old route will be taken by vessels sailing to the Orient, Australia and some ports of South America.

From Europe to Australia and the Orient generally the advantage of distance will be with the Suez route, but if, as is anticipated, in certain quarters, coal prices at stations on the new route can be maintained materially below those on the old, it will be cheaper for many vessels to make the longer voyage.

Prices of British coal at Suez are relatively high, ranging from \$5.10 to \$6.30 per ton, whereas it is expected that American coal will be supplied at Panama for \$1.60 at the outside, and that in due time the price may be gotten as low as \$1.15, or thereabout, at the Pacific end of the new canal.

Obviously if good American coal can be bunkered substantially below \$4.90 a ton, many vessels will be inclined to take the new route to the Orient, Australia and New Zealand. At Norfolk, New River coal is only \$2.70 a ton, and the freight rate from there to Panama is about \$1.40. It is expected that eventually the government will be able to make contracts on the basis of \$2.65 Norfolk, and with \$1.40 for freight, and 50 cents to cover charges for storage, labor, etc., the coal can be supplied f.o.b. at the Atlantic end of the Canal at about \$4.60 a ton, and that the price at the Pacific end will not exceed \$5.

In 1913, the contract price for Welsh coal at Port Said was \$6.33 per ton, the price to those companies renewing previous contracts being \$6.21. It is probable that the United States government can profitably sell coal at Christobal for about \$1.75, and at Balboa for \$1.25 less than the price charged at the Suez Canal. This will be made possible, however, only by the government maintaining coaling stations at the Canal termini and by selling the coal at cost or with but very slight profit.



# Mining in the Pocahontas Field

By AUDLEY H. STOW\*

**SYNOPSIS**—The Pocahontas district has long occupied a preëminent position among the famous bituminous coal fields of the world and the methods adopted there are watched with interest. The best portions of the district are controlled by two holding corporations who lease the land on a royalty basis to the operating companies. To insure the maximum recovery, under these leases, exhaustive studies into the best methods of mining have been conducted, and the results are quite interesting.

The famous Pocahontas coal is characterized more particularly by its relatively low percentage of volatile matter, as compared with other bituminous coals. It is, however, somewhat soft and friable, so that under the rather strenuous methods of modern mining and handling the

more particularly, they are the direct antithesis of each other.

The physical features of the Pocahontas field are unusually interesting. The mountains here, as in a considerable area in both West Virginia and Kentucky, are the result of erosion. The district was doubtless at one

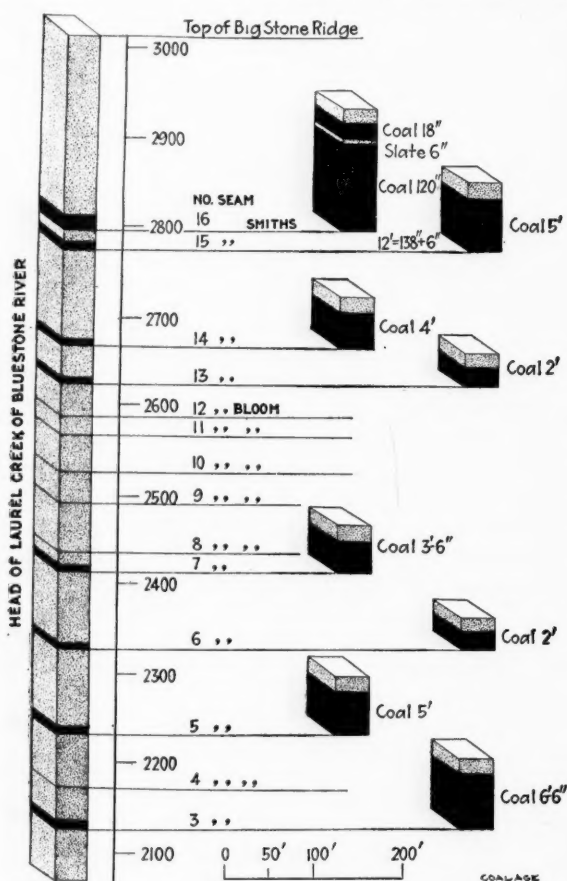


FIG. 1. SECTION OF THE POTTSVILLE MEASURES, SHOWING THE POCAHONTAS SEAMS

percentages of lump, egg and nut are not always as high as would be desired. In texture and appearance, Pocahontas coal resembles the Kentucky, Elkhorn or Jenkins seam of the Consolidation Coal Co.'s new operation, although, on the other hand, the latter has a high percentage of volatile matter, resembling the Pittsburgh coal in this respect. The analysis of the Pocahontas and certain Welch coals is much the same in regard to volatile matter, although as to physical characteristics, hardness

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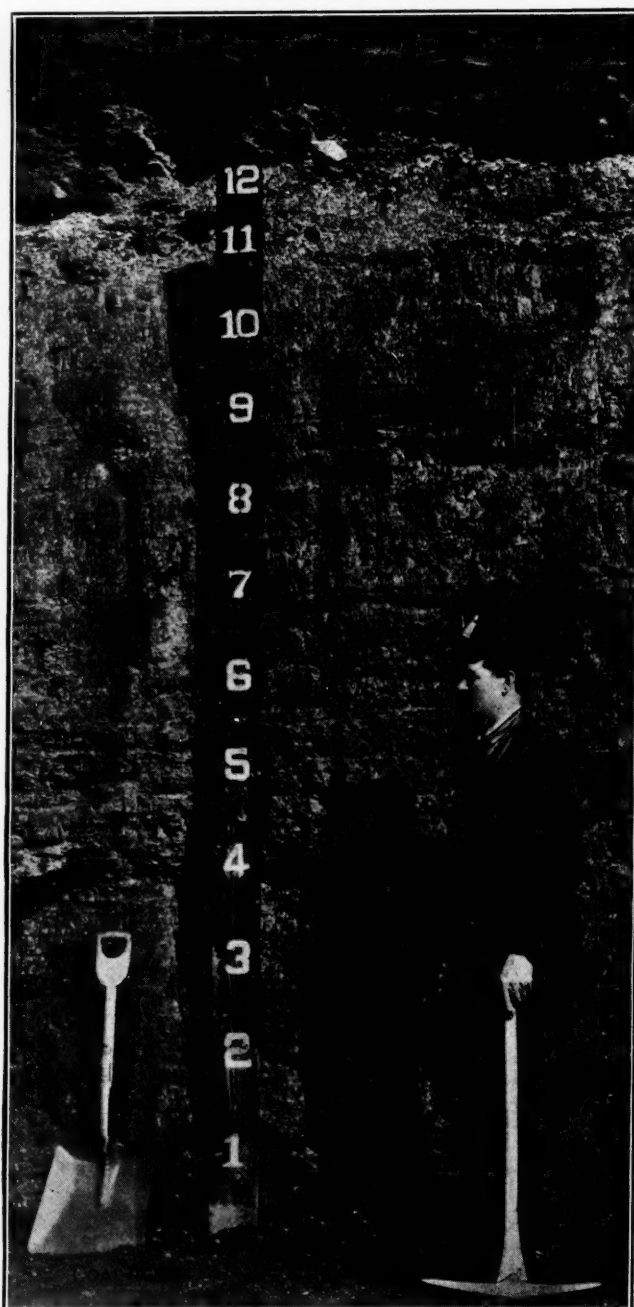


FIG. 2. A 12-FT. OUTCROP OF THE FAMOUS POCAHONTAS COAL

time an immense plains country, which was lifted to a great elevation, with a pitch of three feet in a hundred, toward the Ohio River. Erosion has since been rapid and with the exception of narrow bottoms along the creeks,



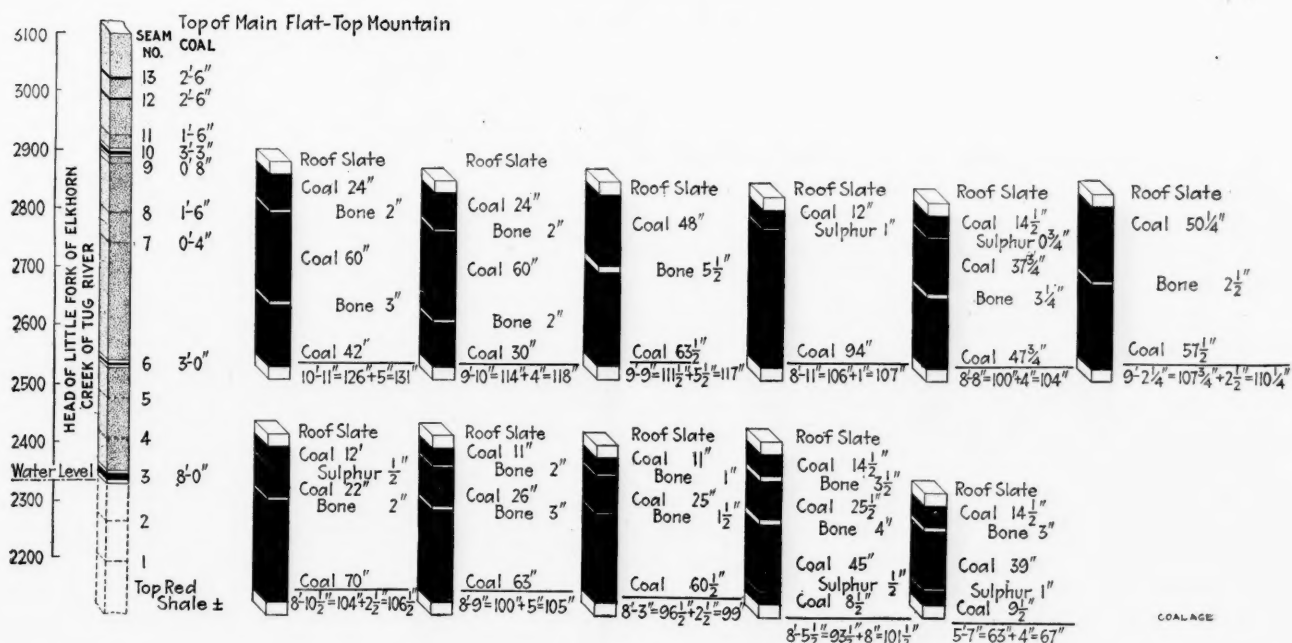


FIG. 3. THE POTTSVILLE MEASURES ON ELKHORN CREEK AND SECTIONS OF THE POCAHONTAS No. 3 SEAM

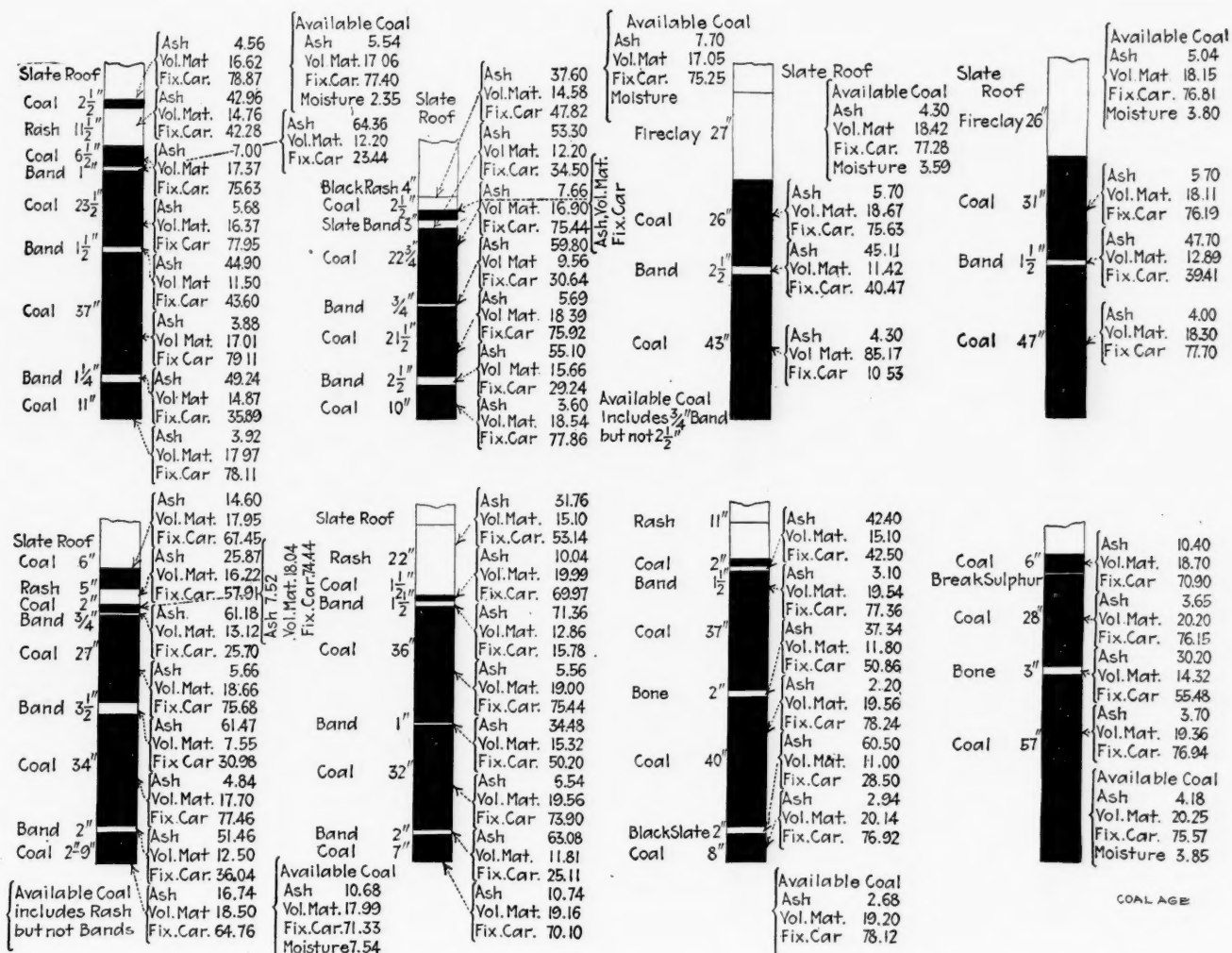


FIG. 4. ANALYTICAL SECTIONS OF THE POCAHONTAS NOS. 3 AND 4 SEAMS IN THE MINES OF THE UNITED STATES COAL & COKE CO., AT GARY, W. VA.

there now remains practically no level land, outside of a few comparatively small areas on the Flat-top Mountains. It is hardly plausible, either, that these areas or plateaus represent the surface of the original plains country.

The geology of the Pocahontas field, which is substantially the same as that of the New River, is well known and even the general statement that these measures are the equivalent of the Pottsville Conglomerate is almost

that of the great No. 3 seam, as is shown by Fig. 1. Judging by sections shown later, large areas of the upper seams, equal in development perhaps to the New River field, have been eroded.

It is considered that the Pocahontas field is a shore deposit. However this may be, the No. 3 seam increases in thickness from Welch, the county seat of McDowell County, W. Va., toward Pocahontas, Va., where it reaches its maximum of 16 ft. in the No. 2 operation of the

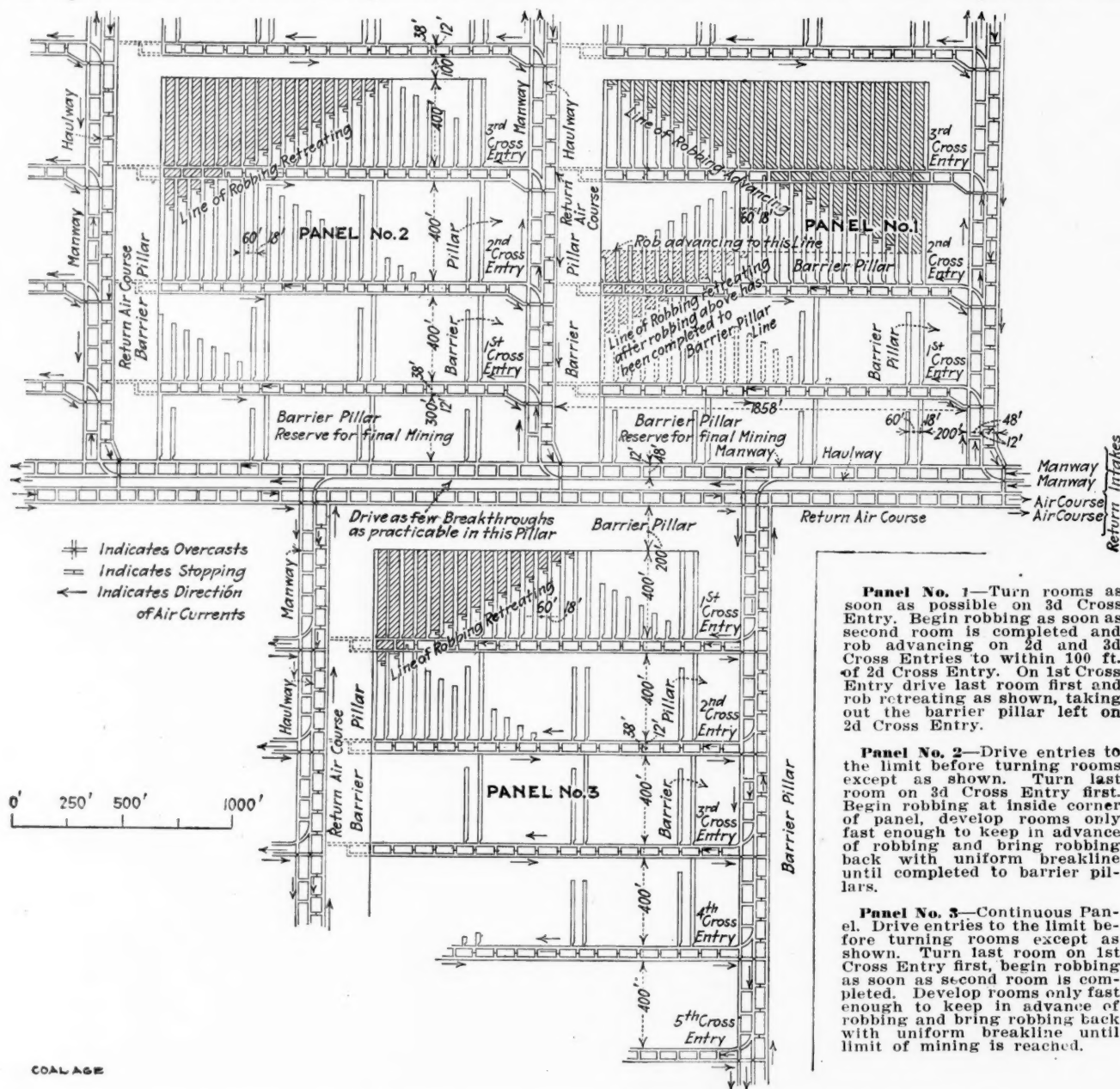


FIG. 5. GENERAL PLAN OF MINE DEVELOPMENT FOR THE POCAHONTAS COAL & COKE CO.

superfluous. The main producing horizon in the Pocahontas field is, however, nearer the underlying red shales than in the New River field. If, however, the Davy field on the Norfolk & Western Ry. be considered a part of the Pocahontas, then we also have what is nearly the equivalent of the New River field.

In certain portions of the holdings of the Pocahontas Consolidated Collieries Co., in the Pocahontas field, some of the upper seams have a development of coal rivaling

Pocahontas Consolidated Collieries Co. This development of the seam is, however, abnormal, a more average thickness being 8 to 9 ft., although this is often considerably exceeded, as shown by Fig. 2, taken along the outcrop at Pocahontas, Va.

We have not, however, reached the Abbs Valley fault, where our No. 3 seam is turned up, rather abruptly, and stands on edge. Whether the location of this fault bears any relation to the original limit of the field, that is, of

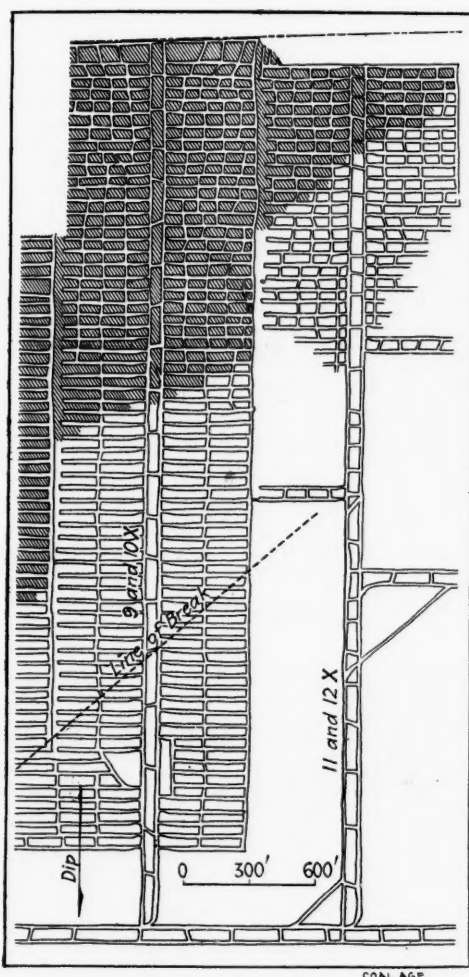


FIG. 6. PLAN SHOWING DOUBLE-ENTRY SYSTEM OF THE UPLAND COAL & COKE CO.

the ancient shore line, is a question of some interest; if this seam continued to increase in thickness on past the Abbs Valley fault, a rare and valuable body of fuel has certainly been lost. The fault line, however, is certainly the limit of the field on this side and may have also been substantially the original shore line; therefore, it is at least possible that it is also the limit of the somewhat thicker portion of the earth crust on which the Pocahontas coal was formed or deposited.

Beginning at a point on Bluestone River, say 25 miles down stream from Pocahontas, the No. 3 seam increases in thickness until the town is reached, but shows no further increase beyond, although it apparently holds its own.

#### LIMITS OF THE FIELD

The Pocahontas field proper is a relatively well defined area, bounded on one side by the Abbs Valley fault, and on the opposite by a line approximately parallel to this fault, and crossing the main line of the Norfolk & Western Ry. at the town of Welch, the county seat of McDowell County. The limits along this line are Susanna, on the Dry Fork, in one direction, and Pineville, the county seat of Wyoming County, on the Guyandotte River, in the other. This is the western limit adopted by the Pocahontas Coal & Coke Co., the Norfolk & Western Ry. in their car-allotment distribution, and by J. J. Lincoln in his tabulated statements of the annual shipments. This limit, however, is not an entirely satisfactory subdivision, as the measures of the No. 3 seam, for instance, really extend still further westward, getting, however, deeper and probably thinner, while the water and gas to be contended with, are necessarily considerable.

The two remaining and opposite sides are less sharply defined. In going from Pocahontas down Bluestone River, the seam becomes rapidly thinner, reducing to

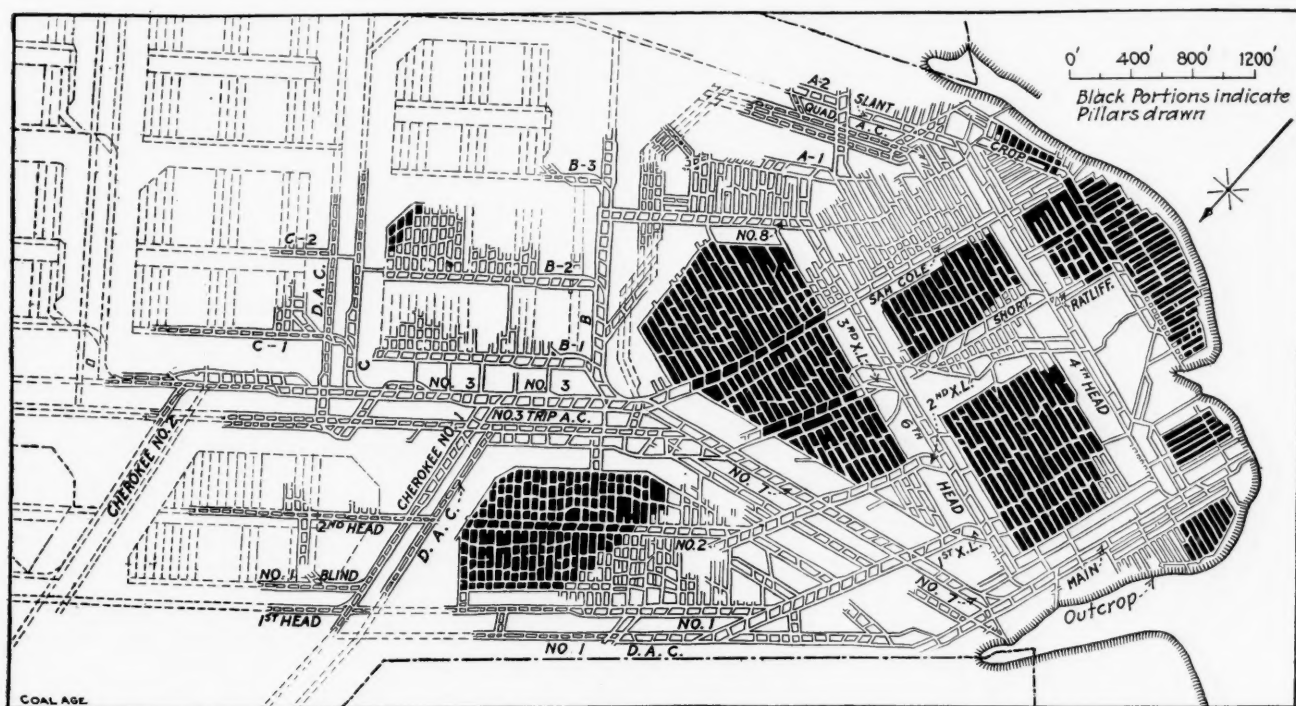


FIG. 7. GENERAL PLAN OF THE POCAHONTAS CONSOLIDATED COLLIERIES CO.'S ANGLE MINE



about 4 ft. in thickness, although it remains above drainage level, so that there is no gas to contend with. In the opposite direction from Pocahontas, along the Abbs Valley fault line, the No. 3 seam becomes deeper and deeper, finally going below water level, and, insofar as I have been able to ascertain, it is no longer found beyond a certain point.

#### DIP OF STRATA

From Welch to Pocahontas is nearly directly up the maximum pitch, which is about 3 per cent, or 150 ft. per mile. From Bluestone River to Pocahontas, and along the Abbs Valley fault, is roughly along the general strike of the measures.

There is one feature here that is of considerable interest from a mining standpoint and one which I have never seen referred to elsewhere. With the Caswell Colliery (Pocahontas Consolidated Collieries Co.) as a center, there is quite an area of the field in which there is practically no general dip. The local hills and hollows in the seam are very moderate and might be likened to the waves of the sea, or rather as the long ground swells on a calm day.

From the Caswell Colliery toward, and past, the town

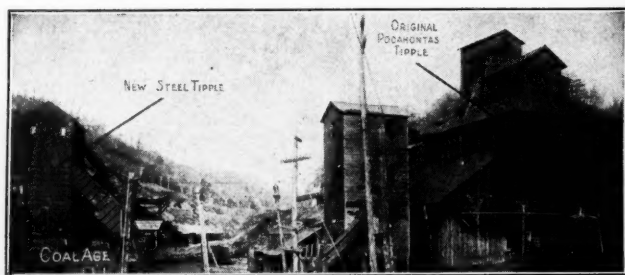


FIG. 8. SURFACE PLANT AT THE ORIGINAL POCAHONTAS TIPPLE

of Pocahontas, roughly on the line of strike, a zone is reached between the Abbs Valley fault, and the usually regular dip toward the Ohio River, in which there is a marked change in the general dip of the strata; a broad anticline having a gentle slope is developed here, along the summit of which the No. 3 seam is locally eroded. From this anticline toward the Abbs Valley fault the pitch is again sharply reversed, immediately at the fault line, resulting in a syncline, one side of which is almost vertical near the surface.

The sections of the No. 3 seam shown in Fig. 3 were obtained in the vicinity of the Pocahontas Consolidated Collieries Co.'s property and are typical of the best of the field in which this company is located. The thinner sections of the No. 3 seam are due to a split that occurs near the top of the seam at different points, Welch, for instance. However, there is, roughly, 6 ft. of coal, divided into three benches, one of 4 ft. and two of 1 ft.; the partings are about 10 in. thick, so can hardly be termed partings, in the usual sense of the word. In spite of the fact that this field was almost entirely bought up 25 years ago, the number of inquiries for strictly number one, low-priced properties, is certainly amusing.

The sections shown on Fig. 4 are from the holdings of the U. S. Coal & Coke Co. and were furnished by Howard N. Eavenson, chief engineer.

#### PLANS OF MINING

The entire Pocahontas field proper is practically all leased out on royalty by two large holding companies, the Pocahontas Coal & Coke Co. and the Crozer Land Association. Under the lease contracts, the holding companies have reserved the right to define the method of working, and the result, on the whole, has been highly satisfactory to all concerned.

A standard plan of mining, by Thomas H. Claggett, chief engineer of the Pocahontas Coal & Coke Co., is shown in Fig. 5; this is largely followed by their lessees, although in instances materially modified, due to local conditions. This large holding company owning or controlling some 275,000 acres of Pocahontas coal, has in active operations some 45 leases, covering about 145,000 acres. The Pocahontas Coal & Coke Co. and the Crozer Land Association control about 75 per cent. of the Pocahontas field, proper, the holdings of the former extending over into the head waters of the Guyandotte River. The Virginian Ry. traverses the northeastern part of the Pocahontas field.

One of the special advantages of the system of mining

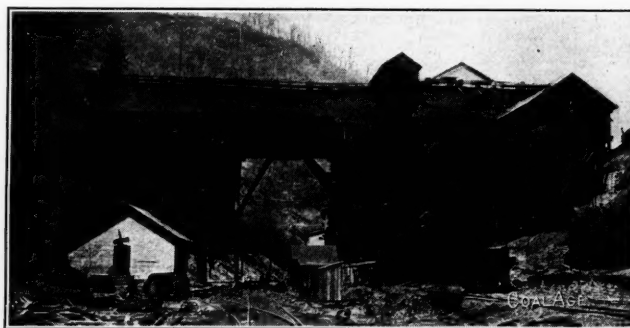


FIG. 9. ANGLE-NORFOLK COLLIERIES OF THE P. C. & C. CO.

adopted by Pocahontas Coal & Coke Co. is the relatively quick recovery of the pillars, and the panels are so driven that the rooms and all entries split the pitch; thus if the maximum pitch is 3 per cent., then the maximum for the workings will not exceed 2 per cent. and may be even slightly less.

The method of working adopted by the Upland Coal & Coke Co. on one of the Crozer leases, as furnished by John J. Lincoln, chief engineer, is shown in Fig. 6. Were the crop line shown on this plan it would be evident that the break line is carried in from the crop and does not involve, strictly speaking, breaks in the solid. There may be several "lifts" where the width of lease is too great to admit of one lift only, as shown. This plan of mining, Mr. Lincoln states, was evolved from a number of years of revisions and has been found entirely satisfactory under all conditions. The main entry is to be driven as near the line of the strike as possible, in order that the reverse grade against the loads may be negligible. If the cross entries are turned off at more than 90 deg. from the main, and the rooms are less than 90 deg. off the cross entries, grades in favor of the loads may be obtained. The Crozer Land Association has 12 operations under active mining.

The Pocahontas Consolidated Collieries Co.'s Angle colliery, as of July, 1912, is shown in Fig. 7. Soon after

taking up the work of the old Norfolk Coal & Coke Co. (which was essentially the nucleus of the Pocahontas Consolidated Collieries Co.) in 1904, the work of revising the systems of mining was taken up in detail. One of the first improvements adopted was the introduction of the multiple air-course system, as illustrated in *The Engineering and Mining Journal*, Jan. 26, 1907, under the title of "Ventilation in Flat Coal Seams." After further discussion, James Ellwood Jones, then general manager of the old Norfolk Coal & Coke Co., and now of the Consolidated, finally approved and authorized the panel system, which was afterward illustrated in a series of articles by myself, in *The Engineering and Mining Journal*.

The Pocahontas measures are not merely the geological equivalent of the Pottsville Conglomerate, but they are also in many instances actually like it, particularly to-

panel, entirely in the solid and with, say, 500 ft. of cover, as shown in Fig. 7, has been almost completed. In the Angle mine, as in the Norfolk, this method of robbing has, so far, been entirely satisfactory. It need hardly be said that the smaller the panel the quicker the returns that may be had from a given territory.

#### TIPPLES

There is, essentially, a Pocahontas type of tipple, not that there are two in the field (except, possibly, the U. S. Steel Corporation tipples) that particularly resemble each other, in detail, yet the "family resemblance" between many of them is quite noticeable. The Pocahontas tipples are a compromise between the simple low structure common to Ohio and Indiana where several grades of coal are screened directly into the railroad cars, and an anthracite breaker.



FIG. 10. GENERAL VIEW OF THE EMPIRE COAL & COKE CO.'S SURFACE EQUIPMENT

ward the top, where the hard, flawless sheets of sandstone are studded with white quartz pebbles. Even where the pebbles are absent, the sandstone is about as low and dense, the thickness being commonly 50 to 80 or 90 ft. without the smallest trace of cleavage or bedding planes. The shearing force of these great sandstones must certainly be enormous and materially affect the pillar work, owing, in part, to the absence of sufficient soft material to pack and thus aid in carrying the weight. The immediate overburden is at times disintegrated, particularly when the surface has been eroded fairly close down to the coal, but squeezes are usually of a vicious nature, if such an expression may be used in this connection. It is due to this that the barriers are much larger than would be necessary in many mining districts.

In my opinion, 1000 or 1200 ft. square is the minimum area that can be safely robbed, in the solid, under these conditions; that is, without a free edge. The second

Quite a few of the more influential engineers in the Pocahontas field in the earlier days, were from the anthracite field. Our valleys are quite narrow and by the time a bank of railroad coke ovens with tracks and miner's houses and other buildings were arranged for, it is not difficult to understand that room for a two-track tipple in the earlier days, appeared to be about the limit; thus storage was necessary for the other grades. In the Pocahontas type of tipple either egg or nut, and slack are usually stored, and commonly all three.

The egg and nut coals thus stored were screened over top screens just before being loaded into cars, so that the slack accumulated in storage was removed, and returned to the slack bin, to be coked. The loss in size of the stored coal at that time appeared negligible, while the slack thus recovered was just that much less to be crushed.

Today the constant conversion of, say, 1/2-in. egg coal,

into slack at a time when the former may be selling at a fancy price, with perhaps little or no demand for coke, appears a serious loss, compared with which the additional outlay for two or three extra tracks where same are at all practical, is a relatively small item.

The original Pocahontas tippie and a new steel tippie, both within the limits of the town of Pocahontas are shown in Fig. 8. Fig. 9 shows the Angle-Norfolk tippie, and Fig. 10 the Empire Coal & Coke Co.'s new steel tippie in which breakage in handling is thought to be reduced to a minimum. The Consolidated has already authorized a new tippie, with two others underway, in



FIG. 11. THE NO. 4 TIPPIE OF THE U. S. C. & C. CO.

which there will be at least four, if not five, loading tracks.

The steel tippie at the No. 4 works of the U. S. Coal & Coke Co. is shown in Fig. 11. In this tippie, after the coal is dumped, it goes to a picking table, and from there through a chute and then over a rubber belt conveyor; it is then either crushed, going into a bin, to supply the ovens, or is sent without crushing into another bin, to be stored as mine-run. In a general way, the main output of the U. S. Coal & Coke Co.'s works is at present crushed slack.

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Coal was for a long time mined extensively on the west coast of British North Borneo on the island of Labuan, but owing to misfortune work was abandoned and the machinery taken out about two years ago. The only mine now worked in North Borneo is at Silimpopon on the east coast near the border of Dutch Borneo.

## Production of Coal and Coke

The advance sheets of the report of C. B. Ross, mine inspector for the second bituminous district, in Pennsylvania, shows 53 out of a total of 54 mines in operation; of these, eight are gaseous and 45 nongaseous. Three new mines were opened and one mine abandoned during the year. The total production of coal for the district, during the year, was 8,521,201 short tons, of which 7,102,581 tons were produced by pick mining, 1,072,954 tons by compressed-air machines and 345,666 tons by electric coal-cutting machines. The total number of persons employed inside the mines was 5472; the number of fatal accidents in the mines 29, and nonfatal 53. The coal produced, per fatal accident inside, was 293,834 tons, and the number of persons employed inside, per fatal accident, 188. The number of coke ovens in operation was 4679 out of a total of 5791, and the coke produced was 2,395,393 tons; number of persons employed at the manufacture of coke, 1450.

The advance report of W. H. Howarth, mine inspector for the 16th bituminous district, in Pennsylvania, shows 37 mines in operation out of a total of 43, of which 28 are gaseous and nine nongaseous. The coal produced during 1912, in this district, was 7,634,497 short tons, of which 3,469,935 tons were produced by pick mining, 2,007,773 tons by compressed-air machines and 2,156,789 tons by electric coal-cutting machines. There were 5224 persons employed in the mines and a total number of 24 fatal accidents occurred, making the number of tons of coal produced, per fatal accident inside, 318,104 tons. The number of persons employed, per fatal accident inside, was 217. There were 5487 coke ovens in operation, out of a total of 5987; while the coke produced was 3,679,233 tons and the number of persons employed at the manufacture of coke, 1165.

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## Binders for Fuel Briquettes

Experience in European countries and investigations made at the fuel-testing plant of the United States Geological Survey at St. Louis, and later by the Bureau of Mines at Pittsburgh, have shown that lignite may be successfully briquetted without the use of any additional binding material, and that the most satisfactory binders for anthracite, semi-anthracite, bituminous and sub-bituminous coals are coal-tar pitch, gas-tar pitch and asphaltic pitch, or inexpensive cementing mixtures that are practically waterproof.

Of the 19 briquetting plants in commercial operation in the United States during 1912, 10 used as a binder coal-tar pitch, or mixtures in which it is the chief ingredient; one plant used asphaltic pitch, two used water-gas pitch; four used mixed binders whose composition is not made public, and two (one operating on peat and the other on carbon residue) used no binder. The number of plants using coal-tar pitch as a binder exceeded all the others put together.

Inorganic binders, such as cement, have not given satisfactory results, for, although they may form efficient binders they have the serious objection of increasing the ash and adding nothing to the combustible elements of the fuel. Binders made of organic material, however, such as pitches from coal-tar, gas-tar or asphalt, contribute combustible material and do not increase the amount of ash.



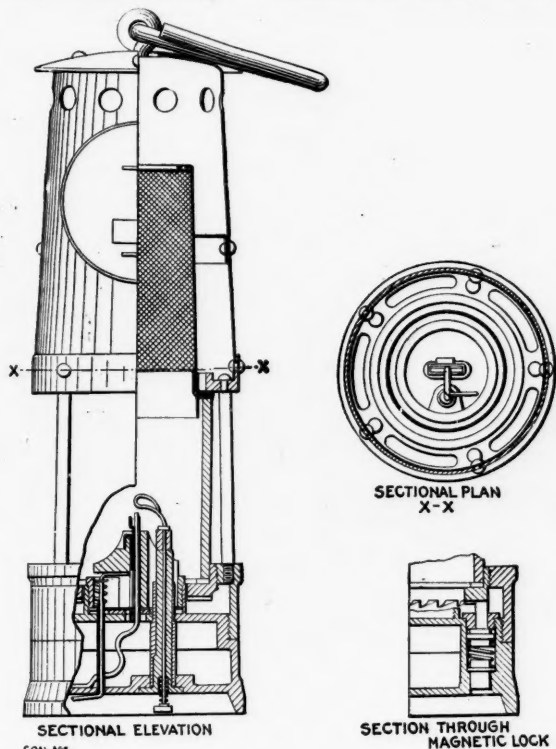
# Our British Coal-Mining Letter

SPECIAL CORRESPONDENCE

**SYNOPSIS**—A review of recent improvements in by-product coke-oven processes and tar distilling. Power can be made at a low price by using gas from coke ovens. Electricity from coke-oven gas is sold in Belgium for less than 7 mills per kilowatt-hour despite the high cost of the fuel used. Much oven gas is purchased by the city of Ghent. The "minimum wage," as provided by arbitration, is so low as to have inappreciable influence on wage scales. Power cables in shafts should be light and unarmored. Some lamps are described which are approved for use by the British Home Office.

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Reference has already been made\* in a previous issue to a paper on the "Progress in Byproduct Recovery at Coke Ovens" read by F. E. Christopher before the Manchester section of the Society of Chemical Industry, and since



THE HAILWOOD LAMP APPROVED BY BRITISH HOME OFFICE

published in the Journal of that society. The following is a summary of his remarks.

The recent changes in coke ovens are in the direction of increase of size and decrease of coking time. In the United States, ovens of the Semet-Solvay type, utilizing the continuous regenerator system, are being built, 5 or 6 flues high, of such size and duty that they will coke 16 tons of coal within 24 hours.

## TAR IS REMOVED MECHANICALLY

Some of the newer byproduct plants remove the tar particles at a relatively high temperature and then pass the gas thus purified through sulphuric acid, thus saving

much of the heat and complication and reducing the waste liquor. In the Simon-Carvé system, the heavier tars are removed by passing the gases through a cyclone extractor without moving parts. The rapidity of the rotation throws the drops of tar to the periphery and causes their deposition. Only the lighter tars go to the extractor. Here the rapid motion of vanes removes the light oily globules and concentrates them centrifugally. To Mr. Christopher, the separate extraction of light and heavy oils seems to be based on correct principles.

The really direct process of making ammonium sulphate, thus briefly sketched, appears to have tempting advantages as far as thermal losses are concerned. The gases contain all the water originally to be found in the slack and that due to the combination of the elements of water in the coal. If these are kept at a temperature above 176 deg. F., the dew point will not be reached and the water will be carried without deposition through the various processes to the place of combustion.

## DIFFICULTIES WITH BENZOL RECOVERY

When benzol is not to be recovered, the direct process is clearly the best to adopt. To obtain the benzol, the gases must be reduced to 77 deg. F. This causes the water vapor to condense but the effluent is clear because of the mechanical removal of tar which precedes such cooling. As no additional water is used in the absorption of the ammonia, that retention being effected chemically by the sulphuric acid, the effluent is only one-half that usually formed.

## FUEL SAVINGS IN TAR STILL

Tar distillation is now receiving more attention from designers and several coke-oven firms are also erectors of tar plants. In a coke-oven plant of the Evence Copper Co., fuel is saved by using the heat in the vapors from the latter portion of the distillation to drive off the water and oils in the earlier part.

The Hennebutte process of tar distillation is now being installed by the Coke Oven Construction Co. Several plants on the continent of Europe are using the process. The tar is first heated by an inclosed steam coil. Then it is passed on to a still, into which air is injected. Some of the hydrogen in the tar combines with the oxygen to form water. The heat thus liberated is amply sufficient to provide for distillation.

Little change can be observed in the design of benzol plants. The tendency today, however, seems toward the production of refined products at the works.

## POWER AT 3 KW.-HR. FOR 2 CENTS

Contracts have been signed for the supply of coke-oven gas to the existing municipal gas-works at Ghent. The gas is to be supplied from ovens of the Semet-Solvay type and the contract is for 105 to 210 million cubic feet per annum at a price equivalent to 10.8c. per thousand cubic feet. Power is also to be supplied at 0.66c. per kilowatt-hour for a guaranteed consumption of 3 to 6 million kilowatt hours.

The importance of the byproducts is shown by the fact that the relative values of the output of an oven are:

\*"Coal Age," Mar. 22, Vol. 3, p. 452.

coke 60 per cent., byproducts 25 per cent. and gas 15 per cent.

#### THE MINIMUM WAGE NOT HARMFUL BECAUSE INEFFECTIVE

It was explained by G. A. Mitchell in a lecture at Glasgow University on "The Minimum Wage in the Coal Trade," that the men at the face are usually paid on contract, because supervision is impracticable. In Scotland, the minimum wage is about \$1.50 per day for every man and boy employed underground. Owing to the advance in miners' wages in Scotland, since the act was passed, the minimum-wage rates have had little effect on wages.

It may be anticipated that when times again become normal the act may (1) destroy, to some extent, the incentive to work, (2) cause many workmen to lose employment, and (3) result in men losing earnings by being sent home frequently from their work. The workmen, in the view of Mr. Mitchell, will not gain any great advantage by the act, except in some cases where the day-wage rates have been raised by its operation. There is no margin of profit to pay the increase of cost, and it must be passed on to the consumer if the collieries are not to stop.

Increased prices might cause a loss of export trade and hamper home industries, unless increases in wages in Great Britain are accompanied by increases in competing countries or lower cost is brought about by improvements. The workmen should cooperate for their own advantage with the operator in reducing costs instead of hampering him by working short time and by opposing labor-saving devices.

#### CABLES FOR MINE SHAFTS

At the present time in Great Britain much attention is being directed to the use of electric cables in the mines; and among other papers, one has been read by E. Kilburn Scott before the Association of Mining Electrical Engineers. Briefly some of his points are: (1) The weight of shaft cables is a most important factor in their design, and in order that it may be reduced, high-tension aluminum cables should be used without steel armoring. (2) The place of the latter as a return-current path can be taken by continuous metal work already in the shaft, or by old haulage ropes suspended for this purpose. Cable sheathing may be employed to give more flexible and impermeable mechanical protection than ordinary steel armoring. (3) Telegraph poles sawn longitudinally are more suitable than plank casing, such as has hitherto been used. Such casing would be cheap and easy to erect, and it would form a complete protection to the inclosed cable.

#### SACCHARINE FOR PRESERVING CASING FOR CABLES

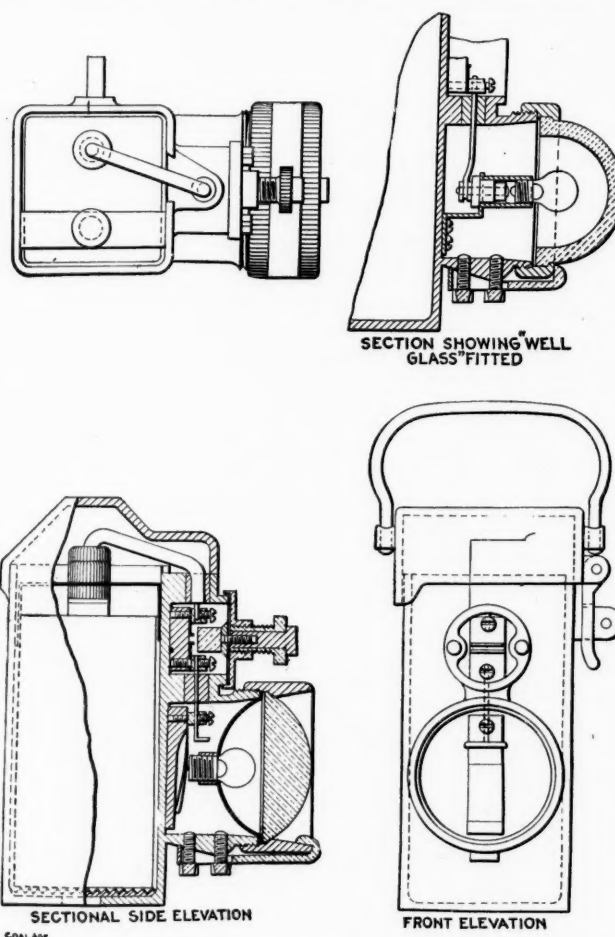
It is better to impregnate wood for casings or cleats with saccharine than with tarry or other chemical substances, because it has no action on insulation or metals. When wood is impregnated with both saccharine and arsenic it is proof against white ants. In a New South Wales mine the armor on a shaft cable was rendered useless by the atmosphere in less than six months, and in Great Britain a steel rope, used in a shaft as the earth return, became so corroded that a special copper cable had to be put in its place.

In discussion the British Electrical Inspector of Mines,

Robert Nelson, declared that he was not in favor of aluminum cables for shafts.

#### APPROVED SAFETY LAMPS

The first lamps approved by the Home Secretary under the Coal Mines Act for use in all mines to which the Act applies are the Hailwood Lamp No. 1 (made by Ackroyd & Best, Ltd., Morley, near Leeds), and the Oldham "Emergency" Electric Lamp (made by Oldham & Son, Denton, near Manchester). The Hailwood lamp is approved, provided that the strength of material and at-



THE OLDHAM "EMERGENCY" ELECTRIC LAMP APPROVED AFTER BRITISH OFFICIAL TEST

tachments throughout the lamp are not less than in the sample submitted to the mechanical tests; that the oil and wick used in the lamp are such that it can maintain all around in a horizontal plane a light of not less than 0.30 cp., as determined by a pentane standard throughout a period of not less than ten hours; that the glass is of an approved type and its dimensions within stated limits.

The Oldham lamp is approved, provided that its total weight is not more than 4.5 lb.; that the strength of material and attachments throughout the lamp are not less than in the sample submitted to test; that the lamp is capable of maintaining a light of not less than 1.5 cp. throughout a period of not less than ten hours; that the lamp is used only for the work of rescue or exploration in the case of an accident or other emergency or by officials.

# Use of Purchased Power in Coal Mines

BY H. C. EDDY\*

**SYNOPSIS**—The writer shows that the central station has most power to sell at the time of day when the operator has most need of it, so that a low price is possible for the coal-mining requirements. Many of his arguments apply equally well to the establishment of private central stations with high-tension current.

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The ideal corporation may be defined as a coöperating aggregation of individuals of specialized ability.

The practical application of this idea has produced industrial companies whose activities frequently become so extensive and so diversified as to make it desirable to separate them into component parts, each exercising those functions which it is especially fitted to perform. Thus we find the huge industrial organizations of today made up of a number of departments, each complete in itself and each virtually a corporation, in the sense of the definition given above.

## COMPETENT HEADS OF DEPARTMENTS IMPOVERISH SMALL COMPANIES

This division and segregation of corporate activities is practicable only in comparatively few instances, as the cost of thoroughly competent heads of departments becomes too great a burden for the companies of less than extraordinary size to carry. In the majority of cases it becomes good business policy to carry out this division of effort by depending upon outside agencies, whose sole function is to supply, in the most economical way, some certain requirement.

Thus the function of public-utility companies is to supply transportation, transmit information and distribute electricity, water and gas, each a highly specialized branch of service calling for the expenditure of much capital, technical knowledge and broad-gauge thought, to reach the fullest possible development.

There is then a sound fundamental basis for the existence of an organization whose sole business is to make and sell power in both large and small quantities.

However sound the abstract theory of the central station as a power merchant may be, its continued existence depends upon its ability, in practice, to supply power on a basis which shall be reasonably profitable to both parties concerned in the transaction.

An analysis of the conditions of use of power in the bituminous coal mines in Pennsylvania and Ohio discloses certain general facts which are decidedly favorable to the purchase of power, when available, as compared with the operation of independent plants.

## MINE AND DOMESTIC DEMANDS FOR POWER NOT SYNCHRONOUS

There are but few mines in these fields that operate more than sixteen hours per day, and many that run but a single shift. The double-shift basis of operation is, however, sufficiently common to be considered typical. The load curve of such a mine shows that approximately

two-thirds of the total kilowatt-hours per day of twenty-four hours, is used between 7 a.m. and 4 p.m., the remaining one-third being used between 6:30 p.m. and 1 a.m.

During the working day the demand is quite variable, fluctuating between wide limits for short periods. The widely different conditions existing in the individual mines make it practically impossible to give accurate values to the various elements of load. In one mine the grades may be in favor of the loads to be hauled by the locomotives, while in another case the reverse may be true; tipples may be above or below the level of the mine opening; fan operation may be required continuously at a high rate of air discharge or the reverse. Notwithstanding all these variables, the general characteristics of the total load are quite uniform in being removed from the central-station peak.

The application of alternating-current motors to mine equipment is not general, practically all mines operated by electric power using direct current at either 250 or 550 volts. This necessitates the use of either synchronous converters or motor-generator sets when power is purchased. When the latter are used it is the general practice to specify synchronous motors, on account of the somewhat better efficiency to be obtained, as compared with induction motors, and also for the improvement of the power factor.

## POWER COMPANIES COVET COAL-MINE BUSINESS

The advantages to the central station which justify low prices for mine power, may therefore be summed up as follows:

The considerable amount of power used.

The "off-peak" load.

The extensive application of synchronous motors, tending to raise the plant power factor, with the attendant advantages.

From the standpoint of the mine operator the advantages of purchased power are more numerous.

## COAL MINES SHOULD USE PURCHASED POWER

The most important consideration is that of cost. It is obvious that in this presentation of the subject, no comparisons of actual figures can be made, but it lies within my province to indicate the essential reasons for a relatively high cost of operation of independent mine power plants.

The controlling element lies in the load factor, which may be defined as the ratio of average use of the equipment required to meet the maximum load conditions.

The daily load factor is much higher than the monthly ratio due to the fact that during the month the average number of working days ranges from 15 to 20, due to car shortage, market conditions and temporary labor difficulties. The annual load factor is even lower, due to the same general conditions, but upon a more extended basis.

The result of this condition is that the investment in power plant and equipment is idle for much of the time, and as interest, depreciation and taxes are continuous charges, the result is that the actual output of

Note—Paper read at the Pittsburgh meeting of the American Institute of Electrical Engineers, Apr. 18 and 19, 1913.

\*Contract agent, American Gas & Electric Co., 30 Church St., New York, N. Y.



the plant carries a very high fixed charge per kilowatt-hour.

This condition does not exist when power is purchased, except so far as it applies to the current-transforming apparatus. The cost of equipment per kilowatt of capacity being much lower than the cost of complete plant equipment, there is a substantial saving to be effected in this item of power costs.

The actual manufacturing cost, exclusive of overhead charges, under conditions of widely varying load and intermittent use of generating equipment, becomes much higher than would be found with exactly the same apparatus working more continuously.

#### THE NECESSITY FOR HIGH-TENSION DISTRIBUTION FOR ECONOMY OF OPERATION

The individual mine plant is usually located at the least favorable point, considered electrically, i.e., at the mouth of the mine. As the mine is developed the electrical center of the load recedes from the plant location and the losses in the distributing system constantly increase. The extent to which it is advisable to increase the investment in copper to minimize voltage losses can be determined only by a careful survey of the conditions applying to each particular installation.

Aside from the actual copper loss, the low voltage obtainable at the point of delivery of current brings in its wake a high maintenance cost for motors on locomotives and coal cutters, chiefly in the form of armature and commutator repairs. These troubles are directly traceable to the abnormal volume of current required by reason of the less than normal voltage. Aside from this actual expense there is the loss of possible output due to reduced capacity of motors brought about by the unfavorable conditions of current supply. This loss is far greater than the actual cost of repairs and its magnitude is often unappreciated by mine operators.

These conditions may be remedied to a great extent, if not practically eliminated, where power is purchased, by placing converters or motor-generators so that the mine distributing system may be fed at several points, thus materially reducing line losses, equalizing line voltage, and bringing it up to the normal working voltage of the motors in use. As the mine is developed and new conditions arise with respect to the distributing system, the location of the conversion equipment may readily be changed. This flexibility is impossible with a complete steam plant.

#### IN ANY MINE LOW-TENSION STATION EQUIPMENT SOON BECOMES USELESS

In any successful concern the growth of its operations is ordinarily greater than originally expected. The coal-mining industry is no exception to this general rule, and operators are periodically faced with the proposition of extending and enlarging individual plants to meet the greater demands for output.

Usually this problem is solved by adding boilers, engines and generators, with a resulting greater investment of capital than would be required by the addition of a motor-generator set. The capital invested in plant equipment in excess of the cost of motor generators would earn much more per year, if put into strictly mining machinery.

#### THE INTELLIGENCE CHARGE

The operators of mine plants are ordinarily handicapped by the character of labor available for power-plant operation. In some cases mines are so located with regard to living conditions that really skillful engineers may be obtained and kept. In more instances, however, the conditions of work and locality of the mines do not prove attractive to the best men except as a temporary expedient. It is more often than not, a case of a more or less regular procession of engineers through the cycle of being hired, endured and "fired."

As a natural result the average mine plant receives less than an ordinary amount of skilled attention, when, by reason of the severe conditions under which it operates, it should receive more. Under such circumstances it is to be expected that the cost of maintenance and repair will be high. Aside from labor conditions the item of boiler repairs and replacement is usually excessive on account of the bad water conditions that are so commonly found in coal districts.

Where power is purchased the care required by conversion apparatus does not call for an expert man in constant attendance. The ordinary daily care required may be furnished by the necessary switchboard operator.

It is obvious that the employer's liability hazard, so far as power supply is concerned is greatly reduced when power is purchased than when a steam plant is operated.

The tendency of labor and other costs entering into the production of power is upward. This can only be met and compensated for in the case of the central station through the use of generating equipment of the very highest economy, by the securing of business of a diversified character of use, enabling the operation of the plant under good load conditions each hour of the twenty-four, and through quantity production.

#### SUMMARY OF ADVANTAGES TO THE PURCHASER

The advantages gained by the mine operator by the purchase of power are direct and may be summed up as follows:

Reduction of fixed charges on investment.

Reduction of actual operating costs due to the fact that only power is paid for, without stand-by charges due to intermittent operation, and by reason of the higher efficiency of electrical apparatus at any load, as compared with steam-generating equipment of the character available for mine work.

Material reduction of distribution losses.

A considerable increase in the output of mining machines and locomotives due to maintenance of speed through normal voltage.

Flexibility of location of motor-generators, enabling them to be placed at points giving the best operating results, and to be readily and cheaply moved as conditions change.

Reduction of labor costs for attendance.

Elimination of high maintenance, repair and replacement costs for boilers, piping and engines.

Reduction of cost of superintendence, enabling the mine superintendent to devote his entire attention to securing output.

Reduction of liability.

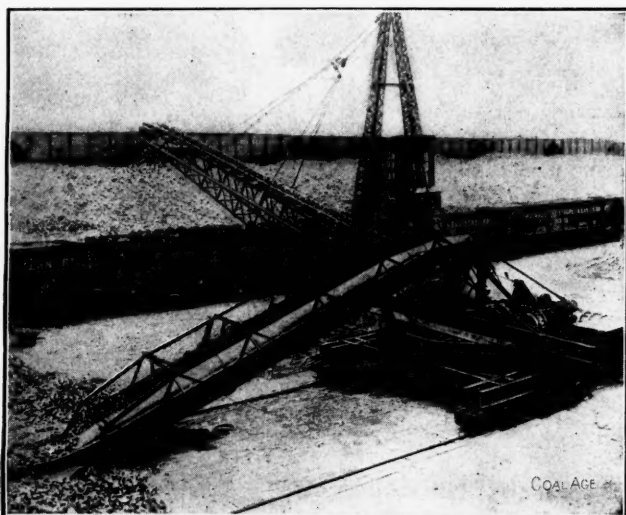
Insurance against constantly increasing power costs, through term contracts at fixed rates.

Additional coal available for sale.

## Storage and Reclaiming Machine

On page 572 of our issue of Apr. 12, we published a description of the Jeffrey-Hamilton storage and reclaiming machine, together with a line drawing of a possible installation.

We illustrate herewith one of these machines which was designed by William E. Hamilton, built for the Illinois Steel Co. and installed at Stockton, Ill. This machine is identical with that illustrated in our previous issue with the exception that it is for a wider gage of track. It has successfully loaded 2000 tons of coke per day which is equivalent in bulk to 3000 tons of coal and it can be used with equal facility for either piling the material upon the storage yard or reloading it into railroad cars.



MACHINE RECLAIMING COKE FROM YARD

Nearly all storage systems in use today break the coal more or less, making careful rescreening and regrading necessary. This may be quite an important item in the cost of coal storage. As an illustration, let us take the case of anthracite coal which we will assume has an average value, including the freight charges, of \$5 a ton. The breakage and degradation resulting from ordinary methods of storing and rehandling is often as much as 10 per cent., causing a depreciation of from 30 to 50c. per ton in total value.

By using a storage machine of this kind in conjunction with a rubber-belt conveyor if necessary, the breakage in storing and reclaiming is practically nil and this item alone, the manufacturers claim, will, in many cases, pay the first cost of the machine in a single season.

## So Near and Yet So Far

There is a tiny hamlet in southern Alaska, called by the natives Katalla, boasting of a few hundred inhabitants, which really knows what the high price of coal means. Each and every ton burned in that town costs exactly \$21.75. And within 25 miles is one of the richest coal deposits in the world. It is the famous coal region about which the Pinchot-Ballinger-Cunningham-Guggenheim controversy was waged. The Federal government now controls those deposits, and the inhabitants

of Katalla are prevented, through this control, from mining their fuel needs, which total only 60 tons annually, and are forced to depend upon fuel mined many hundreds of miles away.—*The Wall St. Journal*.

## The Two Wise Pumpmen

By J. R. ALLARDYCE

(Written expressly for "Coal Age")

You fellows who would like to learn  
Just how to run a mine,  
Get near the pumpman and his pal,  
When these two worthies dine.

They know it all from A to Z,  
And "never had no school";  
Where clean-drilled talent cautious creeps,  
They rush without a rule.

And while they munch their bread and cheese,  
Or wrestle with a chop  
The whole mine scheme is up for trial,  
From motor to a prop.

Hank lights his pipe, and slowly puffs,  
While Slade tucks in a chew—  
'If coal is what they want, says Slade,  
I know what I should do."

The mine is on the bum—that's clear—  
And faster, every day,  
Things peter to a little point,  
Where some fine morn they'll stay..

Hank dumps the ashes from his pipe,  
And fills it up again  
From Tim, the trackman's sack; and says—  
"I can't make out our men."

"I told the boss the other day—  
Says I—it's strange to me  
How that wet west can ever pay."  
"You mind your pumps," says he.

It happened once, this clever pair  
With complex problems wrought—  
When through the trap door popped a light—  
The boss was on the spot—

"Six men, says he, have just gone home  
From water in the south."  
Slade's chew went down, and Hank's old pipe  
Slid from his nerveless mouth.

## Pennsylvania Bituminous Examinations

Examinations of candidates for the office of mine foreman, assistant mine foreman and fireboss, in the bituminous region of Pennsylvania, will be held, May 6, 7 and 8, by the examining boards in each of the several inspection districts.

## Central-Station Power for Mines

BY J. S. JENKS

*SYNOPSIS—Abstract of an address before the Pittsburgh meeting of the American Institute of Electrical Engineers. The paper is devoted chiefly to a historical sketch tracing the development of the West Penn system from its original installation of 120 hp. to its present aggregate of 15,000 hp. in coal-mining service alone.*

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This subject covers such a broad field that it would be folly to undertake to cover more than a limited portion of any particular branch; hence I will deal only with the historical side of the question as it has to do with the development of central-station service in connection with coal mining on the West Penn system.

Central-station power for mine service has been greatly handicapped by the prejudice of some engineers and mine inspectors who have actually fought the installation of such power, stating that it was not as reliable as an isolated plant, was more dangerous on account of the high voltage and more costly.

In order to overcome these objections it was necessary to prove the reliability and advantages of central-station service. The objection of the mine inspectors was the hardest to overcome. Even after the operators were convinced that purchased central-station service was more economical and were in favor of installing it, the inspectors frequently prohibited its adoption for some uses in and about the mines, particularly for fan service.

They contended that mine ventilation was of such importance that no mining company should be dependent on another corporation for its power for fan operation. It was only after years of successful employment in all other classes of mine service that we were able to overcome this prejudice and succeed in getting the mine inspectors to approve central-station service for fans, much less recommend it.

The engineer, and the electrical employees, opposed central-station service for obvious reasons, one of which, frequently frankly admitted, was, that with its adoption they would have no job. The truth of the matter has been that it has actually enlarged their field of labor, as more mines are being electrified every day on account of the many advantages which it offers, thus requiring the services of an engineer and electricians to most efficiently install and operate central-station power.

The first installation of central-station service in a mine on the West Penn system was made at the Larimer mine of the Westmoreland Coal Co. in 1896. It consisted of a 120-hp., 4000-volt, single-phase, 133-cycle, induction-type synchronous motor, belted to a 100-kw., 500-volt, direct-current, multipolar generator.

The switchboard consisted of a standard direct-current marble panel with ammeter, voltmeter, circuit-breaker and switches. The alternating-current board consisted of a wooden panel having mounted on it a small two-pole oil switch for controlling the large motor, a two-pole knife switch for the starting motor, pilot and synchronizing lamps. This apparatus was located in an underground substation as it was feared it might be damaged by employees during strike periods if it were above ground.

In order to supply this service there was installed at the power house of the Irwin Electric Light & Power Co., at Manor, one 150-kw., single-phase, 2000-volt, 133-cycle alternator and a 125-kw. transformer for raising the generator voltage to the transmission and motor voltage.

The line consisted of two No. 4 insulated wires carried by glass insulators on a two-pin crossarm over private right-of-way from Manor to the substation located near Circleville, except through the town of Irwin, where the pole line was on the street. The length of this line was about five miles. A telephone line consisting of duplex insulated wire was strung on a ridge pin on the top of the pole.

The entrance to the underground substation was made by sinking a bore hole through which lead cables were carried to a tunnel which led to the machine room. In order to protect the lead cable where it entered the ground, a high circular stone wall was built around the bore hole.

The apparatus supplied from this substation consisted of six mining machines, a 10-hp. pump and a 60-hp. haulage, but no fan service was supplied for reasons already explained.

The first trouble that developed was the falling in of the substation roof, which not only damaged the apparatus, but put the mine out of service for some time until the bébris could be removed and a brick lining put in to prevent a recurrence of similar trouble. This brick lining sweated so that it made all the apparatus wet, which resulted in frequent burnouts of the starting motor. In order to insure reliability, duplicate starting motors were provided and at times it was a problem to keep one in condition for service. This difficulty was partially overcome by putting a wooden lining inside the brick-work.

The next difficulty arose from a breakdown in the lead cable, caused by lightning. This had the effect of charging everything in the substation. It was overcome by removing the lead from the cable and supporting it on glass insulators, except where it passed through the bore hole.

The next weakness developed in the oil switch which consisted of eight 1½-in. brass rods working through small brass bushings, mounted on a wooden board submerged in oil. This two-pole switch had eight breaks of about ¾ in. each and was contained in a tank 8x10x9 in. and operated by handwheel and pinion. This made a slow-operating switch, with which it was difficult to synchronize. After numerous interruptions, caused by failures of this apparatus, a make-shift device consisting of an ordinary two-pole, two-break, knife switch on a marble base was mounted on insulators in the bottom of a half barrel. The switch handle was removed and a broom stick tied to the crossbar with a belt lace. Leads were brought over the edge of the barrel and connected to the switch. The barrel was then filled with oil, and the switch operated by pulling or pushing on the broom stick.

This switch was so much more easily operated and such improvement was made in the time of synchronizing that the consumer would not have it changed and it re-



mained in service until the substation was finally abandoned on account of the mine being worked out.

The Irwin Electric Light & Power Co. was acquired by the West Penn interests and in 1905 the 133-cycle power house at Manor was discontinued and service established from a 60-cycle turbine station at Connellsville through 28.52 miles of 22,000-volt transmission lines and a substation at Manor. This necessitated the reconstruction of the motors from 133 to 60 cycles. The work on the large machine was done in the field and the starting motors were sent to the factory one at a time. This reconstruction had the effect of reducing the capacity and resulted disastrously in the case of the starting motors, making it necessary to provide larger machines.

The next trouble to develop was rather peculiar in that the large motor started to drop out of step without any apparent cause and would do so when pulling practically no load. This was a puzzling circumstance and no amount of adjusting by the attendant seemed to remedy the trouble. It was found, however, when the supply from Connellsville was generated by a single unit that this departure from synchronism was most pronounced. Later it was discovered that there was a splice in the belt between the motor and generator that caused a jerking which would get in step with the governor mechanism on the turbine, causing the latter to hunt. This hunting was exaggerated in the motor, making it drop out of step. The remedy consisted in direct connecting the motor and generator, which happened to be the same speed.

On account of the high voltage of the motor it was necessary to have its frame insulated and a satisfactory insulating coupling became necessary. This was solved by turning the shafts end to end, setting the pulleys about six inches apart, drilling and tapering their rims and laying a piece of belt around inside of both pulley rims and securing it in place with cap screws. This proved a satisfactory flexible insulating coupling, which gave no trouble and operated for a number of years until the mine was worked out.

Notwithstanding the difficulties enumerated, this installation proved a satisfactory one to the mining company, and led to many other large installations.

The first mine where West Penn service was used for fan operation was at the Penn Gas Coal Co.'s mine near Penn Station, and consisted of a 100-hp., 500-volt, direct-current motor, belted to the fan. This was installed about 1901 when the mine was completely electrified with direct current. The equipment consisted of numerous pumps, mine machinery and a large haulage. The fan operated until 1907 when this motor was replaced by a 200-hp., alternating-current, two-phase, 60-cycle machine. This installation, which originally consisted of about 500 hp., has been increased from time to time until it now has about 1250 hp. in electric motors.

In 1907 our first high-tension installation was made at a coal mine. This was at the Naomi mine of the United Coal Co., near Fayette City. In this case the Coal Co. built its own substation and bought current at 22,000 volts, installing three 200-kw., 22,000- to 440-volt transformers, one 300- and one 150-kw. synchronous motor-generator sets, one 150-hp., alternating-current haulage, a 100-hp. chain lift, two 75-hp. fan motors, alternating-current pumps and numerous haulage locomotives and mining machines.

Another prominent example of a coal-mine installation where the most minute detail was worked out by the engineers in charge with the idea of producing the most efficient results is illustrated by the Keystone Coal Co.'s installation at its Crows Nest substation. Here 1500 hp. is delivered at 2300 volts from 22,000-volt transformers installed in the substation, together with the necessary switches and lightning protection. This installation consists of a 750-hp., alternating-current haulage, two 300-kw. synchronous motor-generator sets, two 150-hp., alternating-current pumps and many locomotives, mining machines and small motors.

While the growth of central-station service was slow at first, it is now growing rapidly, and from the original installation in 1896 of 120 hp. we have steadily added all kinds of mine installations until at the present time we have in operation 76 coal mines, consuming 14,831 hp. and have contracts with 10 companies which aggregate 5701 hp., which is being installed as rapidly as possible. This will make a total of 20,532 hp. In addition to this we are at the present time figuring with a number of coal companies and have every reason to believe that in a short time we will have under contract more than 10,000 hp. additional, which will increase our total to over 30,000 hp. in coal-mine service only.

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## The Alaska Land Frauds

SPECIAL TELEGRAPHIC CORRESPONDENCE

The cases of Raymond Brown and William Dunn, of Spokane, Wash., Charles Doughten, formerly of Spokane but now of Los Angeles, Calif., Charles Mackenzie, of Seattle, Wash., Donald Mackenzie, of Washington, D. C., Seattle, Wash., and Alaska, who were indicted in the federal court at Spokane, November, 1910, charged with conspiracy to defraud the government out of valuable Alaska coal lands, will not go to trial as Attorney-General Townsend will ask that the cases be dismissed.

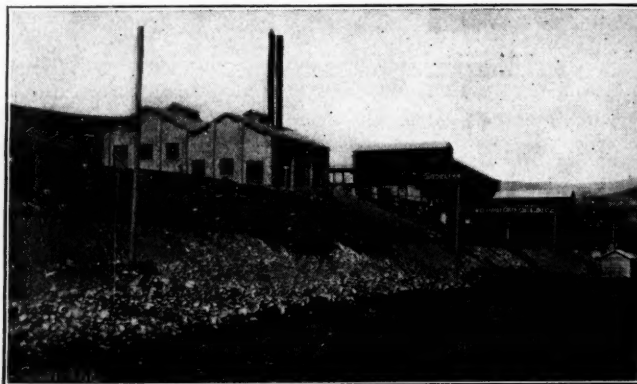
Coincident with the filing of this petition, similar petitions were entered at Seattle and Tacoma, Wash., Portland, Ore., Boise, Idaho, and Juneau, Alaska, desiring that prosecutions be dismissed against other persons indicted for Alaska land frauds during the winter of 1910. The action of the Attorney-General results from the failure of the government to convict Albert C. Frost in Chicago on a similar charge. Townsend planned in case of a conviction of Frost, to press the Western cases through trial during the summer and clear the criminal docket.

The land involved in the present cases consists of 20,000 acres in the Kayak district, valued by the government at many millions of dollars. There are 131 claims, each of a quarter section, which the government declared had been fraudulently obtained. These claims will not be lost to the present owners, among whom are John H. McGraw, ex-governor of Washington, James N. Gillett, ex-governor of the state of California, and Henry T. Oxnard, of New York City, president of the American Beet Sugar Co. These men are assignees of the original claimants.

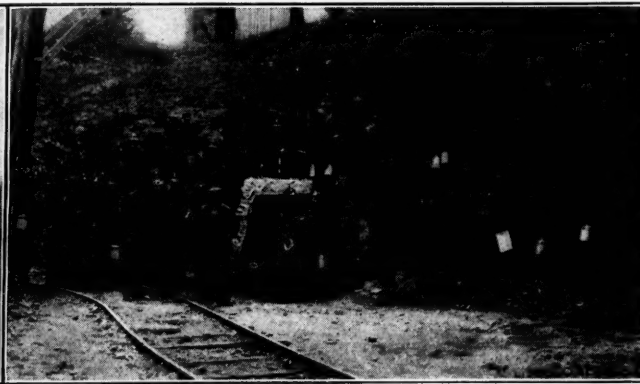
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About 4400 square miles of the state of Tennessee are underlain by coal measures and about half of this area contains workable seams. It is calculated that these beds originally contained 25,665,000,000 short tons of coal.

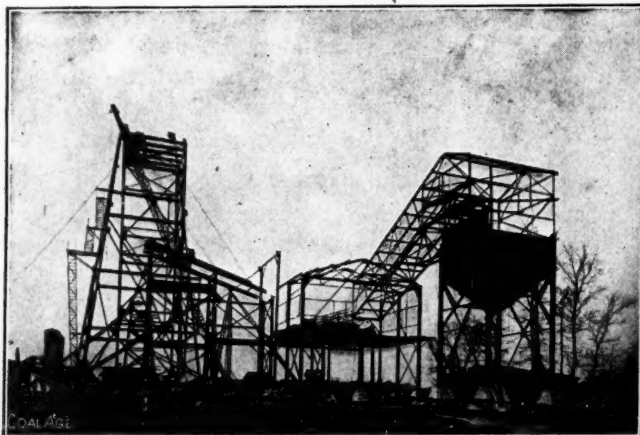
## SNAP SHOTS IN COAL MINING



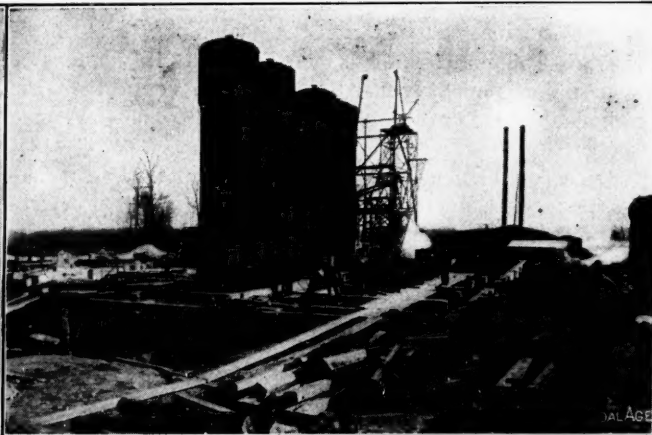
POWER HOUSE AND TIPPLE AT CARBONDALE MINE OF THE MCGILLIVRAY CREEK C. & C. CO.



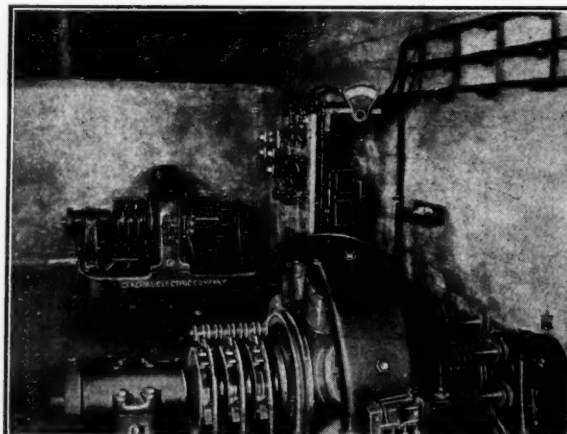
MINERS AT PIT MOUTH, CARBONDALE MINE, AT CARBONDALE, ALBERTA, CANADA



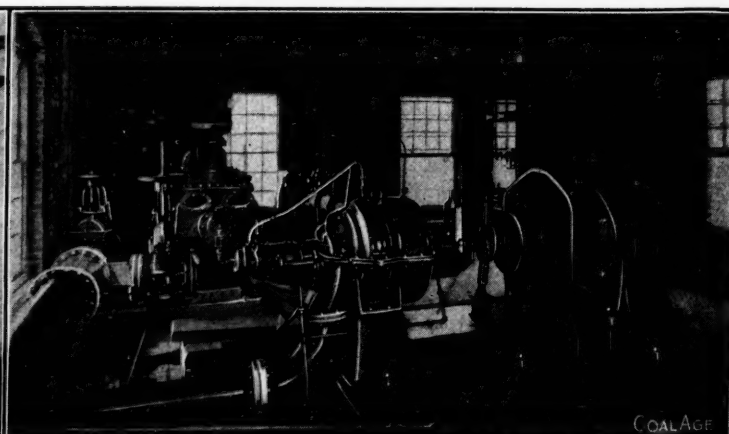
SHOWING THE CHICAGO, WILMINGTON AND VERMILLION MINES UNDER CONSTRUCTION, FIVE MILES SOUTHEAST OF CHRISTOPHER, ILL., ON A SWITCH RUNNING OUT FROM THE C., B. & Q. RAILWAY



FOUR VERTICAL WATER-TUBE BOILERS SET UPON CONCRETE FOUNDATIONS PREPARATORY TO BRICKING IN. A PART OF THE PLANT SHOWN AT THE LEFT OF THIS PHOTO.



ROTARY CONVERTERS IN SUBSTATION AT WOODWARD MINE OF THE D., L. & W. R.R. Co



1200-G.P.M. TWO-STAGE CENTRIFUGAL PUMP AT TRUESDALE COLLIERY, BEING DRIVEN BY G. E. SYNCHRONOUS MOTOR

## EDITORIALS

### "Fools Butt In—"

The upright and most righteous mayor of Boston, Mass., recently wired in great excitement to the President of the United States that "anthracite tonnage was curtailed by restrictive measures for the purpose of preventing a surplus accumulation of coal, according to one of the coal-trade journals." The mayor further asserts that the public was compelled to submit to a heavy increase in the price of coal, owing to a lack of production last summer and hopes that the President will include in his message to Congress "pertinent suggestions in regard to the anthracite trade."

The mayor would do well to look over a few statistics before placing himself on record in such an absurd light. As a matter of fact, there was a tremendous shortage in the supply of anthracite coal last year, due to the suspension in mining during the labor conferences in April and May. But immediately following the fixing of an agreement, the hard-coalers began straining every nerve and concentrating all their powerful resources on the task of overcoming the deficiency with the result that there was a general and consistent smashing of all production records, month after month, during the late summer and early winter. Furthermore, they made every effort to allay the fears of the public that there would be a shortage (which fears speculators were trading upon to their own profit) by issuing periodical statements to the effect that they had the situation well in hand and that there were no prospects whatever of any suffering from a lack of fuel—a boast which as everyone now knows they made good.

Has Boston *another* Lawson?

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### Hydraulic Stowing

The remarks of George S. Rice, chief mining engineer of the Bureau of Mines at the recent meeting of the American Institute of Mining Engineers, have a large degree of timeliness. He stated that:

"In the Upper Silesian coal field, about one-half of the collieries are using hydraulic filling. About fifty independent plants provide for this feature of colliery activity. At one mining plant 5000 cu.yd. of sand are being stowed every day.

"In Westphalia, 27 collieries have adopted the system with 40 independent installations; in Belgium, ten collieries have such plants and in France, several such flushing operations are installed."

Mr. Rice says it will cost American coal-mine owners 30 to 40c. per cu.yd. to make such filling. We hope he is too conservative in this estimate, and that it will be found that when we decide to do the work, we can perform it more rapidly and efficiently than our European competitors.

We get three tons of coal in the anthracite region for every man employed, whereas in Belgium barely half a ton is obtained per man engaged. Applying the rule of

three, the Belgian labor in stowing should be divided by six in the American fields.

This law of proportion, of course, may not hold good, but if stories of the pernicious extent to which division of labor has been carried in Europe are true, we can well believe that here, where there is no such demand for arbitrary divisions, there should be no difficulty in reducing any European costs. Especially should this be the case in the rural districts, where the opposition to the overlapping of trades has not destroyed the efficiency of labor.

But even if Mr. Rice is right, and flushing proves as costly as he anticipates, yet in many places that practice would pay today, by its preservation of the surface, its saving in coal, its extension of the effective life of the colliery and mining town, its complete use of headings and tunnels which must be constructed in any event, its assurance of continued profit to the railroad which has been built to handle the colliery output, its delaying of the time at which the longer hauls with long transmissions of compressed air or electricity will have to be made, its saving of the cost of coal and of drilling, its reduction of the area exposed to fires and favoring the accumulation of firedamp and its effect on beds not yet workable.

The value of a ton of coal in place is more than the royalty payment. Coal should be worth all the outlay which has been expended on its development, whether the expenditure be direct or indirect. In fact, from a broad community point of view, factories and non-company mining towns may be regarded as integral parts of the expenditure on the coal, for on the continuance of coal supply their usefulness largely depends.

Furthermore, we may recall that in Silesia, it has been customary in some places to fill the workings only in certain parts of the whole excavated area and that practice may be possible here. This will largely reduce the cost of flushing per ton mined.

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### Another Coal-Dust Explosion above Ground

There are still a number of persons who do not believe that coal dust is explosive and others who have an utter disregard of its dangers above ground as can be seen in many crusher rooms where dust is made in great quantity and no system of suction is used to remove it or to dampen the deposited dust. That some precautions were taken at the plant where the accident occurred which we are about to describe only emphasizes the danger to which men working in a dry, dusty atmosphere are exposed.

The accident occurred at the Hays yards of the United States Steel Corporation's Homestead works on Saturday, Apr. 5. Five men were shoveling coal into stoker cars from a pit 15 ft. deep. At these works, 40 cars of coal are ground every day for use in the rotary stokers of the steel plant. At 4 o'clock, the coal dust ignited and an



explosion occurred; the workmen near-by rushed up to the pit and saw the five men writhing in the smoke on the floor. The men were pulled out by their fellow-laborers at much risk to themselves. Four are dead and the other is dying.

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## The Breaker Boy and Other Youths

The Republican State Committee of Pennsylvania has prepared a second tentative draft of an act to regulate the employment of minors in Pennsylvania. One of the provisions puts the breaker "boy" into past history. He must now, if the law be passed, be at least sixteen before he goes to work.

The committee appends the following footnote to the clause which prohibits youths under sixteen from working in breakers:

"This section provides a list of occupations all of which are more or less dangerous or injurious, especially to children. Children have been found to be more liable to accident than adults on account of inexperience or carelessness; moreover, through lack of development and physical strength they are more seriously affected by injurious and unhealthful occupations."

A Solomon has indeed come to judgment. Can any statement be less reasonable than that youths should be prevented from working because of inexperience. Surely such lawyers as constitute the state committee, who have repeatedly grilled witnesses on the stand, know that experience is the result of years of practical use of certain materials or of actual performance of specified duties. How can anyone have experience as a beginner? Consequently because there is danger in beginning, why bar youths from labor? The risk of the green hand cannot be avoided. It is, however, to be supposed that the committee really referred, not to inexperience, but to immaturity of judgment.

We are about to present some figures. They are not conclusive because all American statistics are collected in a most incomplete manner and cover only a few parts of human activity. But seeing that they all run counter to the committee's conclusions, they largely weaken the reasoning of that political caucus.

The State Department of Mines of Pennsylvania shows the following numbers of juvenile deaths among outside-mine workers at the following stated ages in 1911:

DEATHS OF JUVENILE OUTSIDE MINE WORKERS, PENNSYLVANIA 1911							
Boys of the following ages							
	14	15	16	17	18	19	20
Anthracite.....	0	1	5	4	5	7	7
Bituminous.....	0	1	0	0	2	1	1

The evidence of these figures is that the youth of 14 has the advantage of the adult of 20. He is probably not so careless, is not placed in so dangerous a situation and is more carefully watched. This is even more apparent underground. In 1911, only five youths working inside the anthracite mines were killed at 16 years of age whereas 20 were fatally injured at 19 years. The evidence shows therefore that forces other than legislative are already protecting the adolescent labor around the mines.

The statement that "through lack of development and physical strength, boys are more seriously affected by injurious and unhealthy occupations" is generally admitted, although, indeed, not by any means, is it necessarily true. In fact, it is probably absolutely false. In digesting the following figures our readers must remem-

ber that in 1900 a still larger amount of child or youthful labor than today, was everywhere in existence, yet the federal statistics show a continuous and well marked increase in the death rate from all causes from the ages of infancy onward.

### POPULATION AND DEATHS IN THE UNITED STATES IN 1900

Years Inclusive	Population	Deaths
5-9.....	8,889,339	2,986
10-14.....	8,091,951	3,663
15-19.....	7,577,324	10,647
20-24.....	7,402,483	17,765
25-29.....	6,583,206	17,606
30-34.....	5,591,545	15,053
35-39.....	4,988,601	13,706

From these figures we see that if we would employ the most resistant persons only, to do the world's work, we would require a period of idleness or mental culture between 20 and 30 and put the children and youths to work.

These figures are backed up by known facts as to the effects of disease. Parents are rather desirous than not that their children shall contract measles and mumps for these diseases have a milder effect on children than on adults and do not recur when once their time has run.

Similarly the American and English statistics show that tuberculosis of the lungs is more fatal in adults than in children:

### DEATHS FROM CONSUMPTION IN EARLY LIFE

Years Included	Consumption United States Totals	Consumption England—males per Million
5-9.....	525	205
10-14.....	719	134
15-19.....	3274	161
20-24.....	6839	676
25-29.....	7154	1858
30-34.....	6285	2114
34-39.....	5686	1964

Moreover, authorities have shown that while children are more responsive to typhus fever, they cast it off with far greater facility than adults. In England, many years ago, when fevers were less adeptly treated, children under 15 years of age who had developed the fever had a death rate of 5 per cent., while adults over 50 years old had a fatality rate of cases incurred of 46 per cent.

But specifically, is mining peculiarly harmful to the young? We apologize for using the figures of the federal census in 1900, so incomplete and so old are they but there is no recourse.

### DEATH RATE OF MINERS

Years Inclusive	Percentage of All Deaths of Miners	Death Rate per Thousand Miners
15-24.....	13.9	5.4
25-44.....	46.4	7.8
45-64.....	21.7	13.1
65 and over.....	17.7	116.6

Clearly the young have more resistance than those in early manhood.

Our figures and our argument should not be pressed too far, but we would urge that reasonably healthy labor for children above the age at which they are willing or are compelled to go to school is not detrimental but advantageous. It braces them physically, mentally and morally and this wealth of labor should not be thrown away. The product of the human race is the pay of the race. He who legislates against labor robs the pay envelope of its purchasing power.

The neurotic's assumptions that children are being ruthlessly hurried to an early grave has never been subjected to careful proof. We need information which will enable us to take a safe and sane action in regard to labor, and the coal industry would welcome a scientific inquiry, which would ascertain the proper course of procedure.

## SOCIOLOGICAL DEPARTMENT

### Rescue Work in Fifeshire, Scotland

SPECIAL CORRESPONDENCE

It is now a legal requirement in Great Britain that collieries provide breathing apparatus and all the equipment for rescue work, including carefully trained brigades, or they must make arrangement with some central rescue stations within easy call, so that a fully equipped brigade may be available at short notice.

Some time ago the Fifeshire Coal Owners' Association appointed a committee to make inquiries regarding rescue apparatus for use in mines. Among other matters, the committee reported:

1. That a central station equipped with about 20 sets of apparatus ready for use in case of emergency is necessary for the needs of the county of Fife. This station should be in telephonic communication with every colliery in the district and located at Cowdenbeath.



A MOTOR CAR FOR A SCOTCH RESCUE STATION

2. That a certain number of sets of apparatus (say not less than five) should be kept ready at every colliery.

3. That at least 20 men at every mine, including all the officials who are acquainted with the workings, should be instructed in the construction and use of the apparatus.

4. That an intelligent man should have the care of the central station. He should be capable of instructing the men in the use of the apparatus and in the manner in which it should be kept in condition.

It almost seems unnecessary to remark that a central rescue station, however well it may be equipped in other respects, would be of little avail in time of need if it were not furnished with the means of speedily getting to the colliery from which the call for help may come. In view of this, the various central stations have been provided with specially fitted rescue motor cars. The Fife and Clackmannan Coal Owners' Association has purchased a car for the Dunfermline Station from the Albion Motor Car Co. A photograph of this truck accompanies this description. The car resembles an ambulance wagon.

The inside of the car is arranged to seat ten persons, and there is also accommodation for two passengers on

the chauffeur's seat outside. Beneath each seat inside the car, there is space for a set of rescue apparatus.

At the front end within the car a space is provided for three oxygen cylinders, and in cabinets, also on the forward end, four smoke helmets are carried, with three cases of caustic potash and two ambulance boxes. Two stretchers are suspended from the roof. On the floor in the center of the car a hand pump is placed, so arranged that passage is not obstructed in passing to or from the wide doors at the rear of the car.

The body is built throughout of best ash and oak framing with mahogany panels. It is painted an artistic shade of gray with red lines, the inside dimensions being 9 ft. 9 in. by 5 ft. 9 in., complete with canopy over the chauffeur's seat and two windows in the center at either side with louvers above.

The chassis upon which the body of the wagon is mounted is a 32-hp. Albion of four-cylinder, chain-driven type, with single solid tires on front wheels and twin solid tires on the rear.

There are several groups of plants, in the United States, which should combine to provide a car of this kind. They are situated so far from a locomotive yard that an engine is not always available for use. The adoption of motor cars has been delayed, however, by the fact that most large coal corporations are affiliated with railroad companies and naturally rely on rail connections in planning their rescue work. Another obstacle has been found in the condition of the roads which a rescue motor car must travel.

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### A Census of Benefit Funds

The *Dodge Idea* contains the following statement, entitled "Benefit Funds for Factory Employees" and written by W. L. Chandler. This paper is published monthly by the Dodge Manufacturing Co., of Mishawaka, Iowa. The editorial staff of the journal has recently sent out twelve inquiries to which those controlling over 100 funds replied. The information has been extended by the use of the reports of the Bureau of Commerce and Labor in reference to over 400 funds:

#### 1. Does a Company Profit by Having a Benefit Fund among its Employees?

Thirty per cent. of the funds which have reported, receive regular contributions from the operating company, but this seems only to lower the cost to members, as no reasons are apparent why all the funds cannot be entirely self-sustaining.

Four cases were found where funds controlled by employees alone had disbanded. The failures, as far as investigated, were not of such a character that they should influence others against the starting of benefit funds.

The membership of all funds comprised on an average 48 per cent. of the total number of employees of the factories at which the funds were established.

#### 2. Should a Fund Insure against Temporary Disability due to Sickness?

Ninety-three per cent. of the funds provide this feature and such as do not are organized for the purpose of paying death benefits only, except one which only provides for permanent disability and superannuation and two which only pay superannuation pensions.



Of all funds (comprising about 350,000 members) the average cost per member per year for temporary disability due to sickness and accidents combined (these cases not being reported separately) was \$3.42. The amounts paid weekly and the duration of the payments were so varied as to make it impossible to strike an average. Dues and benefits will be discussed later.

### 3. Should a Fund Insure against Temporary Accidental Disability?

Ninety per cent. of the funds now pay such benefits regardless of compensation paid by the operating company. They settle with the fund membership much as other accident insurance companies adjust the claims with their clients. Of these funds 22 per cent. are managed, at least in part, by the firms which have created them. Some establishments reimburse the funds for any money paid out to compensate members who may have been hurt at work. This is done in lieu of direct payments to the injured. Some of the funds do not pay for any accidents for which the establishments are liable under the law.

Ninety-three per cent. of the funds, managed by employees alone, pay temporary disability benefits for accidents. A few funds restrict the accident benefits to cover only certain definite accidents such as those which are incurred when at work or when going to or from work or when not on duty, etc.

Ninety-one per cent. of the funds managed entirely by establishments or jointly by employees and the employing firm now pay temporary disability benefits for accidents.

It remains to be seen what may result later from the enactment in various states of employers' liability laws and workmen's compensation acts.

### 4. Should a Fund Insure against Permanent Disability Resulting from Sickness?

Twelve per cent. of all funds pay benefits for permanent disability and one-third of these, or 4 per cent., apply the benefits to cases due to sickness as well as accidents.

Of the funds paying benefits for permanent disability (sickness and accident cases not reported separately) a quarter of one per cent. of the members received such benefits in one year.

The average cost per member covering both sickness and accident for the year was 48c. The various schedules of benefits are too varied to permit of averaging.

### 5. Should a Fund Insure against Permanent Accidental Disability?

Data given with the previous question should be considered here also. It will be noticed that twelve per cent. of the funds now have such provision. It remains to be seen what effect may follow the enactment of employers' liability laws and workmen's compensation acts.

### 6. Should a Fund Insure against the Death of a Member through Sickness?

Eighty-three per cent. of the funds have this provision. The amounts which in these funds are payable at death of a member (sickness and accident cases not reported separately) vary from ten to one thousand dollars, but the average death claim paid in one year was \$209.76, or an average of \$1.45 for each member of all funds paying death benefits. The death rate per 1000 members of all funds reporting their deaths was 6.7. This is lower than the general death rate of the country, because only able-bodied persons can gain or retain employment in a majority of establishments.

### 7. Should a Fund Insure against the Accidental Death of a Member?

Figures given above for amounts paid for death benefits apply here also, as the funds did not distinguish in their reports between sickness and accident.

Ninety per cent. of all funds have benefits for members dying from the effects of an accident. Ten per cent. of these apply it only for accidents when on duty.

### 8. Should a Fund Insure against the Deaths of Members' Wives?

Twenty-two per cent. of all funds have this provision. The average annual cost to these funds for death benefits for members' wives averaged 25c. per member. This experience covers 65,889 members.

### 9. Should a Fund Insure against the Deaths of Other Dependents of the Members?

Ten per cent. of all funds have this provision. The average annual cost of these funds for benefits for death of dependents other than wives, average 28c. per member. This experience covers 44,381 members.

### 10. Should Any Distinction Be Made between Salaried Employees and Day Workers?

Of the funds under observation there seem to be few which make any distinction.

### 11. Should Membership Include both Males and Females?

Eleven funds divide the sexes and provide separate regulations for each, covering dues, benefits, etc. Of the total membership of all funds, 10 per cent. are females, and of the members of funds reporting female members, 11 per cent. are females. Fifty-six per cent. of the establishments where more than five females are employed have a provision for female members. The suffragettes may have something to say on this question.

### 12. Should Membership Be Compulsory?

Where funds were managed by employees only 30 per cent. of the employees of the establishment were enrolled.

Where the management rested with the establishment, 75 per cent. were enrolled and where the firm and employees managed jointly 66 per cent. enrolled. Of all the funds, 15 per cent. had more or less compulsory membership. Various exceptions are found; some excuse office clerks, boys and girls, those employed before the organization of the fund, and those earning less than a fixed sum per day.

Twenty-five per cent. of compulsory funds were managed by employees but were evidently strongly endorsed by the establishments, while 50 per cent. were managed jointly by employees and the firm for which they worked.

One fund writes that they had 95 per cent. of their employees enrolled before compulsory membership was required of all employees.

Some establishments having pension funds, require membership in the benefit funds to entitle employees to pensions, thus stimulating the employees to accept membership in these funds.

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## Swimming Pools

It is reported that the H. C. Frick Coke Co. is so well pleased with the experimental erection of a swimming pool and amusement hall at Leisenring, that it purposes establishing pools, measuring 75 ft. by 40 ft., and building gymnasiums at all its plants. Instructors will teach the employees how to swim. Cinder tracks will also be built for track events.

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## West Virginia Mining Institute

The executive committee of the West Virginia Coal Mining Institute has selected Morgantown as the place for holding the summer meeting, which will be in session June 24, 25 and 26.

Papers will be read and discussed on the following subjects:

"Gasoline Motor Haulage in Mines"; "A New Type of Undercutting Machine"; "Welfare Work in the Mining Communities of West Virginia"; "The Qualifications of a General Manager from a Superintendent's Point of View"; "Hydro-Electric Power in Mining; A Description of the Cheat River Installation."

The program is so arranged that approximately one-half of the three-day session will be spent in sight-seeing and pleasure-seeking. Papers and discussions will occupy Tuesday and Wednesday mornings. On Wednesday afternoon, the members of the institute will be conveyed by automobiles to Mt. Chateau, a noted summer resort along the Cheat River, and from there to Sabraton, where an inspection will be made of the tin-plate plant of the American Sheet & Tin Plate Co. and the mammoth glass industries. The return to Morgantown will be in ample time to enjoy a banquet to be tendered by the city board of trade.

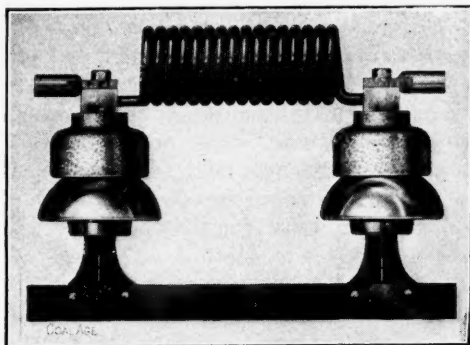
Thursday will be devoted to visiting the most representative mines in the Connellsville coke region. This will permit an examination into the methods of mining and coking the celebrated Connellsville coals, and furnish bases for comparison with the conditions and methods at home plants. Committees, selected jointly from the local membership and the city board of trade, are actually preparing to provide for a large attendance at the summer meeting.



## Choke Coils and Disconnecting Switches

The choke coils and disconnecting switches illustrated herewith were recently bought out by the Electric Service Supplies Co., Philadelphia, Chicago and New York, and several unique points in the design of this apparatus deserve comment.

The bases of both the choke coils and disconnecting switches are of standard 3-in. channel iron. These bases permit the apparatus to be installed either inside or out, to be attached to switchboards direct, to cross-arms, to poles, to pipe or to any other suitable means of support.

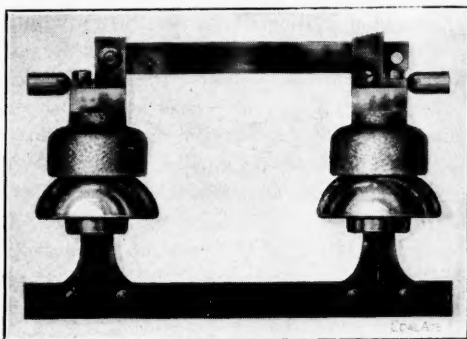


CHOKE COIL

Iron pins are riveted to this channel, and insulators cemented to these pins support galvanized iron tops, cemented to them, which tops in turn support brass terminal blocks for either the choke coil or the switch mechanism.

Choke coils are sweated into these blocks, which in every case are provided with separable terminals. The coils are air-insulated between turns; this is advantageous, because if arcing should occur between adjacent coils, the insulation (air) is immediately reestablished after the passage of the discharge.

The manufacturers claim that these choke coils are rugged in construction, possess great electrical and mechanical strength, and that their design has been worked out so that they afford great protection to electrical ap-



DISCONNECTING SWITCH

paratus when used in conjunction with their standard types of lightning arresters. They are made for voltage ratings up to 23,000 and for all standard ampere capacities.

In the disconnecting switch, the clips are sweated into the brass terminal blocks, and are made of machine finished, pure, hard-drawn copper. The blades are hung in the clips as shown, and tension screws are provided at

each end to secure proper contact. Separable terminals are provided on these switches for all capacities.

These disconnecting switches are designed and intended for use not only as lightning-arrestor disconnectors, but also as switches for disconnecting and controlling high-voltage lines, branch feeders, emergency feeders, etc., and for other purposes for which such switches are required.

They are made for voltage ratings up to 23,000, and of ampere capacities to meet any operating condition.

❖

## A Good Boiler Test

The Narragansett Electric Light Co., of Providence, R. I., recently ran an eight-hour boiler test on a 390-hp. Babcock & Wilcox boiler equipped with a Riley self-dumping underfeed stoker with five retorts, during which 216.3 per cent. of the builder's rating of the boiler was developed.

The boiler in question was 16 ft. long, 12 tubes high and 18 tubes wide. It was operated throughout the test at a pressure (practically without variation) of 175 lb. per sq.in.

Nineteen thousand seven hundred and five pounds of coal were fired, thus making the rate per hour 2463 lb. Analysis of this fuel showed 77.44 per cent. fixed carbon, 15.42 per cent. volatile matter, 5.46 per cent. ash and 1.68 per cent. moisture. As fired the coal contained 14,728 B.t.u. per lb. The weight of water fed to the boiler was 217,600 lb., the average temperature being 196.6 deg. F. The actual evaporation per pound of coal as fired was 11.04 lb. of water, the equivalent evaporation from and at 212 deg. F. being 11.81 lb.

The stoker was narrower than the boiler, so much so that two more retorts could have been installed which would probably have given correspondingly greater consumption of fuel and evaporation of water. The boiler was 12 years old and was one of a battery of two, the other being cold at the time of the test.

The fire appeared to be in about the same condition throughout the entire trial and the boiler was kept on the line after the test was over. One notable advantage was that there was no period of dumping as the stoker automatically cleaned itself of ashes continuously and thus avoided fluctuations incident to periodic ash removal. The coal was thoroughly burned, there being but a slight excess of air.

❖

## First Aid at Old Forge Colliery

The contests of the first-aid teams of the Old Forge Colliery, of Jermyn & Co. were held on Saturday evening, Apr. 5. The outside team won first prize, making 91 points out of a possible 100. Inside team No. 2 was second with 82 points, and inside team No. 1 was third with 68 points. Between 600 and 700 people witnessed the exhibition. Following the contests a banquet was held, and President Joseph Jermyn presented the winning team with a large silver loving cup. He congratulated the winners on their excellent work, and also Dr. Edwards, of Taylor, who drilled the teams. Mr. Jermyn promised to send the winners to Pittsburgh next fall to participate in the annual state contests.

Each member of the winning team was also presented with a watch fob, appropriately engraved. The following men made up the winning team: David Davis, captain; William Williams, Lawrence McDermott, Charles Llewellyn, and Lawrence Fallon. The members of the other teams are: Inside No. 1, John B. Price, captain; Walter Tibbs, Patrick Kelly, and Harry Edwards; Inside No. 2, James McGinley, captain; William Riddel, Michael McNulty, Joseph Hart, and James Marino.

## DISCUSSION BY READERS

### Education in Coal Mining

*Letter No. 2*—Referring to the discussion on Education in Coal Mining, allow me to make a few remarks on this subject, gained from my observation as inspector of mines during the last decade. I wish to draw attention briefly to the importance of higher education along this line.

It is my opinion that a higher educational standard should be set by our examining boards, in addition to the technical and practical requirements. It is true that many of the workmen in the mines have not had the advantage of a common-school education; but this feature will be less prominent as time goes on, owing to the school law requiring that children attend school until they arrive at a certain age. Those who follow mining will, in the future, have an easier road to travel than did their fathers, who, seeing the advantage of a mining education, have spent much time and burned the midnight oil at their studies. Many have had to start at their A B C's; but, step by step, they have finally mastered the object of their ambition through the assistance of mining books and papers and correspondence schools. By their efforts many such men have risen to high positions in the mining world; and have become successful general managers, superintendents, mine inspectors, mine foremen, etc.

I have noticed that the average man, after receiving a certificate for mine foreman, which was evidently the height of his ambition, has thrown his books aside. He begins to think he is competent to fill that position at any mine. He fails to understand why some foremen can obtain positions at mines where a high salary is paid, while he holds a less important place. But the secret of the matter lies in the fact that the higher positions with good salaries require a man having more thorough and up-to-date education on mining problems, and who can make an intelligent report to higher officials on any conditions they may meet in the mine. Such men earn the support of their superiors. By their education they learn to exercise good judgment and are successful in handling the workmen. In other words, education is the means of making a broad-gaged official—one who, while he has all these qualifications, is still pursuing his studies as an ardent student of mining conditions, reading up-to-date mining literature and having always the ambition to attain higher honors.

I do not mean by these statements that the successful foreman is compelled to keep in his head all the formulas pertaining to mine ventilation, chemistry and mechanics; but he should be so familiar with the subjects that he could readily refer to his library and know where and how to get the information he desires and how to apply it, just as a mining engineer refers to his field book for the sine, cosine or tangent of a required angle; or a lawyer refers to his library to ascertain the law on a certain case.

This point leads to the use of textbooks at mining examinations, and as I have been a member of examining

boards for mine foremen and firebosses for the last ten years, I am firmly of the opinion that we would get some very good men as mine officials were they permitted to refer to their textbooks and work out the questions asked at these examinations; whereas, if they are required to work out such problems by trying to remember the formula in the particular case, they would make a failure. I know of several such cases where the party can sit down and work any ordinary ventilation problem if allowed to refer to his textbook for the formula, but he cannot remember the formula in an examination. I will say that if textbooks are allowed at examinations, the books should contain only formulas, and be so arranged that it would be up to the student or applicant to know just what formula he should use for the question under consideration.

It is the desire of the examining boards to make the examinations for mine foremen and firebosses as nearly practical as possible. Only such technical questions as are absolutely necessary are generally included. But I am of the opinion that there should be more technical questions, in addition to the practical questions asked, in order to ascertain the capabilities of candidates along certain lines. I am also of the opinion that all miners should be urged to read certain mining literature bearing on their duties and explaining the dangers pertaining to certain methods that they persist in following, and describing how they can increase their efficiency.

I believe that every person should serve a certain length of time as assistant mine foreman or fireboss before he is allowed to assume full charge of a mine—especially a gaseous mine; and if he serves under a good foreman, his chances are better for becoming himself a successful foreman. I have seen old practical miners, who had a good education, pass a good examination and yet make a failure as mine foremen and superintendents, because they were unable to manage men; their judgment was bad and they could not apply their mining experience and education to the proper supervision of the mine.

I am of the opinion that a person wishing to attain a mine foreman's certificate should educate himself along the following lines: Reading, spelling, writing, elementary English, arithmetic, to cube root of numbers. A mining course should include mine gases, safety lamps, mine ventilation, blasting, timbering of mine workings, mine haulage, mine mechanics, electricity, practical methods of developing and operating mines, and should teach men how to read and understand mine maps. If one attains a fair education on the above subjects, in connection with the practical experience required by the state mining laws, there should be no question about his being able to pass an examination.

I will say further that the advantages education offers to those wishing to better their condition are as accessible as the air we breath. Institutions, as well as private instructors, have offered their services free to those wishing to avail themselves of the opportunities, and I am glad to say that many have taken advantage of



these golden opportunities; but, on the other hand, there are many who have not availed themselves of these opportunities. Some have started who did not have the will power to give up pleasure and have dropped back in the old rut, spending their spare time in idleness. My advice to the young man connected with mining is: Avail yourself of any opportunity to secure a good mining education. These opportunities, for first-class ambitious men, are increasing daily.

F. W. CUNNINGHAM,  
Mine Inspector, 21st Bit. Dist.

Charleroi, Penn.

*Letter No. 3*—I want to say I favor the use of textbooks at mining examinations. There are so many branches of science connected with coal mining and the scope of the questions asked in the examinations is so great, that the average man cannot undertake to memorize a sufficient number of the formulas required to answer the questions, which he must do if he is to pass a satisfactory examination. I believe where the answer to any question involves the use of sines, cosines, tangents, etc., these should be given in the questions. It might be well where a formula is required to work the question, to print the formula with the question, as this would save the candidate much time looking through the textbooks to find the formula he wants to use.

I may say that I have been successful in seven examinations, held in three different states; but I would add that the time spent in these examinations was, for the most part, a season of anxiety for me. My brain was not as clear and I could not collect my thoughts, in the examination, as when going about my daily occupation. Had I been allowed the use of a textbook, as at home, it would have been a wonderful help to me.

I have often thought that many of the questions asked at mining examinations were too far advanced in mathematics for the average miner to answer without a textbook to which he can refer. It is one thing to ask a question and another thing to give the proper answer to the question asked. Anyone can ask a question that will require an educated man to answer. For these reasons, I think textbooks should be allowed in some of the examinations of mine foremen and firebosses.

R. J. PICKETT.

Shelburn, Ind.

*Letter No. 4*—There appears to be a large difference of opinion among mining men as to whether textbooks should or should not be used at mining examinations, by candidates seeking certificates of proficiency that would make them eligible to the position of mine foreman or fireboss. Some men who are opposed to the use of textbooks in examination, claim that the proper formula should be given with each question. Others argue that neither formulas nor textbooks should be provided, but that the candidate should take the examination without helps of any kind.

In my opinion, it would be much better to conduct these examinations without allowing the use of textbooks or giving any formulas. A candidate will often show that he knows nothing of the question by using a wrong formula, and to give the formula with the question would, in this case, be giving the candidate just the information he needs to answer the question correctly. If textbooks were to be allowed in a mining examination, I believe

such a practice would tend to lower the standard of the examination. Men would depend too much on the books and grow careless about reading and studying the theory and principles of mining. They would not be so anxious to know the reason "why." Many of them would not be able to transpose the many formulas pertaining to mine ventilation.

I will give here an instance where I believe the use of textbooks in an examination would do the candidate more harm than good. I believe if the following question was asked and textbooks were allowed in the examination, 95 per cent. of the candidates would apply the wrong rule. The question is:

In a certain mine, a current of 66,000 cu.ft. per min. is passing under a pressure of 5 lb. per sq.ft.; what quantity of air would be circulated in this mine if the pressure was increased to 8 lb. per sq.ft., the power remaining the same?

Ans.—41,250 cu.ft.

Looking in the book the candidate would find a rule reading somewhat as follows: "The quantity of air in circulation in a mine or airway varies as the square root of the pressure." Applying this rule, he would get about double the right quantity of air for his answer. When the "power remains the same," as stated in this question, the quantity of air in circulation varies inversely as the pressure.

Another reason why textbooks should not be allowed in examination is that the man who has a good school education, but who knows nothing at all about mining, would be more likely to pass the examination for mine foreman than the man with only a fair education, but who has worked all his life in the mines. I think that to encourage such a practice would be doing an injustice to those who, by hard study, have reached their present standard.

JOSEPH NORTHOVER.

Seanor, Penn.

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## Sudden Collapse of Working Places

In reading Mr. Lane's letter regarding the sudden collapse of mine roof, *COAL AGE*, Mar. 29, p. 500, it occurred to me that the trouble, in the instance he describes, was due to leaving too small a rib when driving up the center of the pillar. It seems evident, from his description of the occurrence, that the side pressure probably shoved the legs of the timbers in at the bottom. Mr. Lane states that the bottom was hard, and probably the timbers stood erect, without any batter or other provision against side pressure.

I would not consider two 12-ft. ribs, in this high coal, a sufficient thickness to support a roof pressure due to 500 ft. of cover. Under these conditions, we might expect a creep or squeeze to start; and, in my experience, no timbering of this sort was ever effectual in stopping a squeeze. The most that could be expected of the 5-in. timber frames, mentioned in Mr. Lane's letter, in a 9-ft. seam of coal overlaid with 500 ft. of cover, would be to steady the immediate roof strata and possibly give warning when the pressure came on or the "weighting" of the roof occurred.

When an undue weight is thrown on the pillars, it is not always shown by "nipping" of the top coal, or the "heaving" of the bottom; but when the pillars or ribs are narrow and the weight comes on, the coal begins to spall off at the middle of the seam, just as a post under great



pressure bows out and breaks in the middle. However, assuming that the "bearing in" or mining, in this seam, is near the bottom, the bottom coal would be broken when the squeeze first came on; and the great pressure would then be apt to kick out the timbers at the bottom if they did not break.

Permit me to say that I think this accident would not have occurred if, instead of splitting the pillars, which were already weak, they had cut across near the face, each time, in lifts of about 15 ft. I have always thought that splitting should be avoided unless the pillar is about twice as strong as necessary; because by so doing the rib is weakened at the very time it most needs its strength. Ample pillars and a regular breaking line will do much to guard against the loss of coal and timber and avoid the sacrifice of many lives. It seems to me there is no reason why large pillars should not always be left, except where a maximum of machine coal must be obtained. In most cases, after the room centers exceed about 35 ft., the wider the pillars between the rooms the fewer times does the track turn have to be laid, for a given tonnage. If the centers are wide enough to require a turn anyway, they might as well be sufficiently wide to give ample support to the roof pressure.

E. C. TAYLOR, Supt.,  
Keystone Coal & Coke Co.

New Alexandria, Penn.

## Another Letter

In reading of the sudden collapse of a working place, as described in COAL AGE, Mar. 29, 1913, p. 500, it seems to me that there are two good reasons that may be given as causing the sudden collapse of the roof in that case.

Mr. Lane does not state the time the miner quit work the day before the accident; but we will say it was 4 o'clock, and from that time until 3 o'clock the next morning when the fireboss made his first round, the roof had been working continuously. In this condition, it was about ready to fall when the fireboss made his examination, but was held in place by the frail timbers, which were 9 ft. long and only 5 in. in diameter. When the mine started again in the morning, the roof began to work the second time, and the breaking of the light post at the face started a heavy fall of roof that kicked out the timbers in order, back from the face, as it fell.

The second reason that may be given is that the timber was altogether too light for use in a seam of coal 9 ft. thick, under the heavy roof cover. It is impossible to wedge a 9-ft. post 5 in. in diameter very tight, without first bracing the legs from one timber frame to the other, with a plank spiked between them. I would say that heavier timbers should have been used in the working face.

Scranton, Penn.

THOMAS R. PIERCE.

# Study Course in Coal Mining

BY J. T. BEARD

## The Coal Age Pocket Book

### MINE AIRWAYS

**Definition of Terms.**—The term "airway," in mining, generally relates to a passageway for the circulation of the air current, in distinction from a haulage road or travelingway, although these entries may serve also as airways. The entry by which the air current enters the mine is called the "intake," and that by which it is carried out of the mine, the "return." In like manner, the two shaft or slope openings in a mine are called, respectively, the "downcast" and the "up-cast."

The "perimeter" of an airway is the distance measured around the circumference of its cross-section. The "area" or "sectional area" of an airway is the area of its cross-section.

The "rubbing surface" of an airway is the entire inner surface of the same; and is found by multiplying the perimeter  $o$  by the length  $l$ , of the airway; thus,

$$s = lo$$

**Essential Features of Mine Airways.**—Airways in mines should be as straight as possible and void of sharp bends and other obstructions that increase the resistance of the airway to the flow of air. The shape of the airway is important as affecting the pressure required to pass a given quantity of air.

**Shape of Airways.**—The cross-section of an airway may be a circle, square, rectangle, ellipse, or any combination of these that best meets the needs or conditions. For the purposes of ventilation, that form of airway is best that has the shortest length of perimeter, for the same area of section.

In this respect, the circular airway is first; the ellipsoidal airway next, until the major axis exceeds 2.73 times the minor axis when, for the same area, the perimeter is equal to that of a square airway. The square airway is then third in the series and the rectangular and trapezoidal forms last.

There are, however, other requirements than those of ventilation. Haulage requires a level bottom for the roadway. Roof conditions or economy of driving entries may make an arched roof out of the question, making it necessary to adopt the square, rectangular, or trapezoidal shape. Again, a weak coal and heavy side pressure may demand an ellipsoidal shape of section or a special type of timbering approaching the same. It is not uncommon to arch the roof of airways for a distance, using either a semicircle or a semiellipse to form the arch, the latter being called a "flat arch."

The closer the ellipse approaches the circle or the nearer a rectangle comes to being a square, the less is the perimeter of the airway, for the same area of section. For the same length of airway, the perimeter is proportional to the rubbing surface of the airway.

**Calculation of Airways.**—In order to facilitate the calculation of the perimeter and sectional area of the different shapes of airways, we give the diagram shown on the following page, which explains these calculations for each case.

## The Coal Age Pocket Book

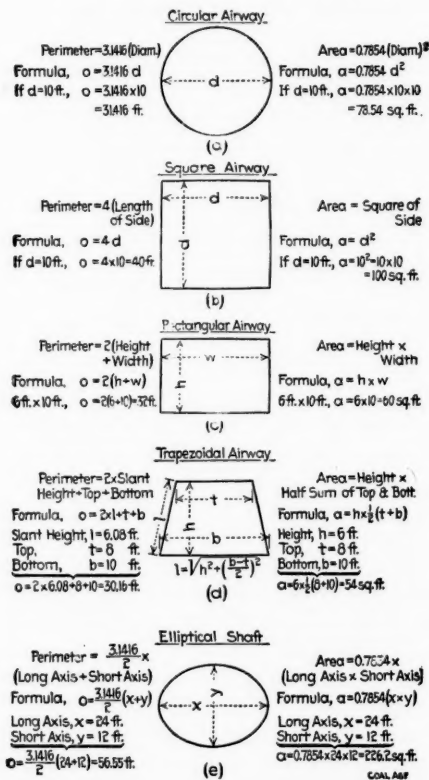


DIAGRAM SHOWING METHOD OF CALCULATION OF PERIMETER AND AREA OF AIRWAYS OF DIFFERENT SECTION

## INQUIRIES OF GENERAL INTEREST

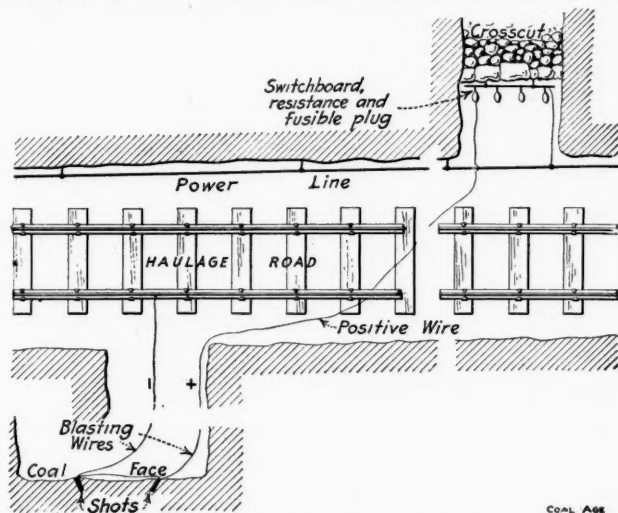
### Firing Blasts by Trolley Connection

I want to ask if it is a dangerous practice to fire a heavy charge of, say eight or more holes together, by connecting the blasting wires with the trolley wire on the main haulage road, or with any other live wire conducting current into the mine. Will such a connection for that purpose affect, in any way, the dynamo at the power plant?

RICHARD EVANS.

Olyphant, Penn.

The usual practice in electric firing, in mines, is to employ a magneto machine for generating the electric current, although it is not an uncommon practice to use the power lines for the purpose of firing. In such cases, however, a special arrangement is generally preferred, similar to that shown in the accompanying figure, which consists in introducing a safety or fusible plug into the positive wire conveying the current from the power line to the coal face. There should also be introduced into



SHOWING ARRANGEMENT FOR FIRING BLASTS BY POWER-LINE CONNECTION

this wire a sufficient resistance consisting of several incandescent lamps, to reduce the current. While this is not absolutely necessary, it is generally considered safer practice. The negative, or return wire, may be connected with the rail.

A switch is also introduced into the positive line to enable the current to be turned on after all connections have been made. To insure greater safety, the fusible plug in the positive wire should always be removed and only introduced after everything is in readiness for firing. This forms an extra safeguard against the current being suddenly turned on at the switch before everything is ready.

It is possible to fire shots in mines, without taking the precautions named; but there is more liability of accidents occurring and the blasting wires may be fused by the strong current flowing in the power line. This,

however, would not prevent the explosion of the blast. In presence of gas, there is always the danger of the sparking of the wires at the switch igniting a possible explosive mixture.

The firing of the charge, in any case, could not affect the dynamo at the power plant, any more than does the change of load due to turning on or shutting off the current of the motors used in haulage or coal cutting and drilling. A little experimenting may be required to ascertain the number of lamps that should be introduced as a resistance to reduce the current sufficiently for the purpose of firing.

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### Percentage of Fuel Consumed

There are two boilers in operation at a certain plant. No. 1 boiler burns 1168 tons of coal in the same time that No. 2 boiler burns 652 tons. I want to ask what per cent. of fuel does No. 1 boiler burn more than No. 2?

G. S. T.

Harrisburg, Ill.

No. 1 boiler burns 1168 — 652 = 516 tons more coal than No. 2 boiler consumes. This quantity of coal is

$$\frac{516 \times 100}{652} = 79.1 \text{ per cent.}$$

of the coal consumed in No. 2 boiler. Therefore, No. 1 boiler consumes 79.1 per cent. more coal than No. 2 requires.

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### Barometric Pressure

Since warm air is lighter than cold air, why does the barometer record the same pressure in summer as in winter, at the same elevation above sea level? I should think that the warm air in summer would cause a less pressure and the reading of the barometer be lower than in winter.

N. M. RIGSBY.

Sale Creek, Tenn.

The change of seasons does not affect the temperature of the air surrounding the earth, for a great distance above the earth's surface. Very little of the heat of the sun is absorbed in its passage through the atmosphere; but the heat absorbed by the ground is radiated back into the atmosphere and warms the lower atmosphere in contact with the earth, making this air lighter. The effect, however, is not sufficient to cause a great change in barometric pressure.

It is true, nevertheless, that the average barometric pressure is greater, in the northern hemisphere, in the winter months than in the summer season, reaching a maximum about January and a minimum about July. This is explained under "The Barometer," Study Course in Coal Mining, Mar. 29, p. 501. The daily variations of barometric pressure and the variations due to atmospheric changes are so much greater, however, as to wholly absorb the effect of the change of seasons.

# EXAMINATION QUESTIONS

## Surveying

(Answered by Request)

**Ques.**—Calculate by sines and cosines the bearing and length of the closing line of the following traverse of a survey:

Station	Bearing	Distance (feet)
1	N 43° 18' E	145
2	S 62° 25' E	122
3	S 72° 43' W	93
4	S 69° 55' E	232
5	S 8° 15' W	173
6	N 81° 10' W	141
7	S 3° 05' W	128
8	S 43° 18' W	136
9	N 9° 08' E	285

British Columbia Exam.

**Ans.**—The plat of this survey is shown in Fig. 1. The first step is to calculate the latitude and departure of

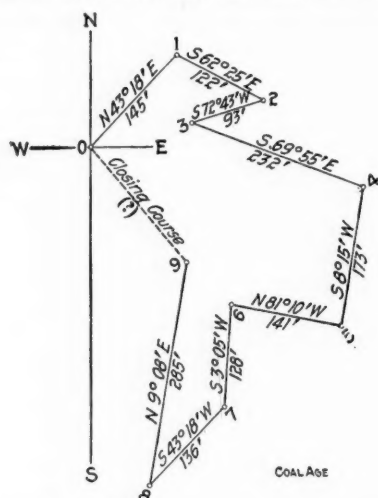


FIG. 1.

each course. The latitude is either a "northing" or a "southing," and the departure either an "easting" or a "westing," as indicated by the bearing of the course.

The latitude and departure of each course is found by multiplying the length of the course by the cosine and sine, respectively. Thus, the latitude of the first course being a northing (N) and the departure an easting (E), they are found as follows:

$$N = 145 \cos 43^\circ 18' = 145 \times 0.72777 = 105.53 \text{ ft.}$$

$$E = 145 \sin 43^\circ 18' = 145 \times 0.68582 = 99.44 \text{ ft.}$$

In this manner, the northing or southing and the easting or westing of each course is calculated and written in the proper column as follows:

Course	Bearing	Distance	N	S	E	W
1	N 43° 18' E	145	105.53		99.44	
2	S 62° 25' E	122		56.49	108.13	
3	S 72° 43' W	93		27.63		88.80
4	S 69° 55' E	232		79.67	217.89	
5	S 8° 15' W	173		171.21		24.82
6	N 81° 10' W	141	21.65			139.33
7	S 3° 05' W	128		127.82		6.89
8	S 43° 18' W	136		98.98		93.27
9	N 9° 08' E	285	281.39		45.24	
			408.57	561.80	470.70	353.11
Closing course			153.23			117.59
			561.80			470.70

The next step is to calculate the angle of bearing of the closing course, which must have a northing of 153.23 ft. and a westing of 117.59 ft., in order to make the sum

of the northings equal to that of the southings and likewise the sum of the eastings equal to that of the westings, in the completed survey. Referring now to Fig. 2, the angle of bearing  $a$  is found as follows:

$$\tan a = \frac{\text{departure}}{\text{latitude}} = \frac{117.59}{153.23} = 0.7674$$

and  $a = 37^\circ 30'$ .

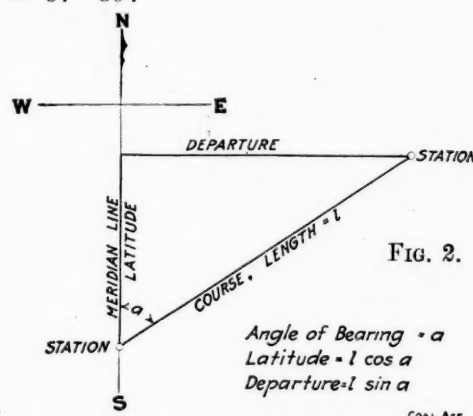


FIG. 2.

Angle of Bearing =  $a$   
Latitude =  $l \cos a$   
Departure =  $l \sin a$

COAL AGE

The length of this course is then calculated by dividing either its latitude by the cosine of the angle of bearing, or its departure by the sine of the same angle. For example, the length of the closing course 9-0, in this case, is

$$l = \frac{\text{latitude}}{\cos a} = \frac{153.23}{\cos 37^\circ 30'} = \frac{153.23}{0.79335} = 193.1 \text{ ft.}$$

OR

$$l = \frac{\text{departure}}{\sin a} = \frac{117.59}{\sin 37^\circ 30'} = \frac{117.59}{0.60876} = 193.1 \text{ ft.}$$

The closing course of the survey is, therefore, N  $37^\circ 30'$  W, 193.1 ft.

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## Correction

(See p. 575, last issue)

**Ans.**—The weight of the loaded trip is  $25 \times 4600 = 115,000$  lb.; the weight of the rope,  $6000 \times 1.2 = 7200$  lb., which makes the total load hoisted, when the trip is at the bottom of the incline,  $115,000 + 7200 = 122,200$  lb.

The tension or pull on the rope is equal to the sum of the gravity pull and the friction pull. In this case, the inclination being small, the gravity and friction pulls are calculated as follows, taking the coefficient of friction as 0.025:

$$\text{Gravity pull} = 122,200 \times 0.05 = 6110 \text{ lb.}$$

$$\text{Friction pull} = 122,200 \times 0.025 = 3055 \text{ lb.}$$

$$\text{Total pull on rope} = 9165 \text{ lb.}$$

A speed of 13 miles per hour is  $13 \times 5280 \div 60 = 1144$  ft. per min. The horsepower of the engine required to draw this load up the incline at a given speed is then

$$H = \frac{9165 \times 1144}{33,000} = 317.7 + hp.$$



## BOOK REVIEW DEPARTMENT

**FIFTEENTH BIENNIAL REPORT OF THE STATE INSPECTOR OF COAL MINES OF COLORADO FOR THE YEAR ENDING DEC. 31, 1912.** James Dalrymple, Chief Inspector Denver, Colo. 138 pp.; 6x9; paper.

Besides the usual statistics giving the production of coal and the accidents in mining, the report contains many valuable recommendations. Attention is drawn to the failure of the attempt to obtain new mining legislation in 1910. At that time a commission was appointed to investigate the great loss of life in mines and prepare a new mining bill, which was presented to the 18th General Assembly, but so mutilated in the Senate as to be later vetoed by the governor. The report states that the present mining law is the same as it was nearly 30 years ago, and draws attention to the incompetent class of miners now employed, which, together with the improved machinery, is responsible for the high death rate in the state. It is stated the death rate in Colorado is double that of the United States taken as a whole.

The report gives an account of the Hastings mine explosion, June 18, 1912, when 12 men were killed; also an account of the Piedmont explosion, August 29, 1912, entailing the loss of two lives.

**ANNUAL REPORT OF THE MINE INSPECTOR FOR ALLEGANY AND GARRETT COUNTIES, MD., FOR THE YEAR ENDING APRIL 30, 1912.** John H. Donahue, Inspector. 36 pp.; 6x9; paper.

The production of coal in Maryland for 1911 was 4,166,736 long tons, being a decrease of 496,792 tons from the production in 1910.

The report gives an account of the drainage of the old Borden shaft, abandoned 21 years ago, and which had recently become dangerous from the accumulation of water, and was a menace to adjoining properties. A brief description is given of each of the mines in operation.

**ANNUAL REPORT OF THE STATE INSPECTOR OF NEVADA MINES FOR THE YEAR ENDING NOVEMBER 30, 1912.** Edward Ryan, Inspector of Mines. 79 pp.; 6x9; paper.

This report is practically confined to the metal mining industry in Nevada, but is of interest in coal mining as referring, page 24, to "Nevada's only known coal deposits." The report states that the mining of coal in the state is an "infant industry," which may never get out of its "swaddling clothes." The principal coal operation is that of the Nevada Coal & Fuel Co., which recently received its lease from the Nevada Coal Co. and is developing a 16-deg. slope, described in the report as "an inclined shaft." The slope is 725 ft. long and has a vertical fall of 200 feet. The seam of coal varies from 3 to 5 ft. in thickness. The quality of the coal improves as the development progresses. The mine is not as yet productive, although numerous shipments have been made at different times. The property of the Darms Coal Co. lying adjacent is being prospected with core drills.

**FIFTEENTH ANNUAL REPORT OF THE BUREAU OF LABOR AND INDUSTRIAL STATISTICS FOR THE STATE OF VIRGINIA.** 148 pp.; 6x9 in.; cloth bound.

The report is of great interest to the coal industry of Virginia, including as it does on pp. 98-110, a copy of the new mining law, approved March 13, 1912. This law is Chapter 178 of the Virginia code, entitled: An act concerning coal mines and safety of employees, creating a department and inspector of mines under the Bureau of Labor and Industrial Statistics.

The new law is a vast improvement in coal-mining legislation in Virginia. The law makes numerous specifications, providing for the safety of employees and determining the duties of both miners and operators, providing also suitable penalties for the violation of its provisions. The law specifies a standard cotton-seed oil for use in the mines.

**ANNUAL REPORT OF THE STATE COAL MINE INSPECTOR OF WYOMING FOR THE YEAR ENDING SEPT. 30, 1912.** 57 pp.; 6x9 in.; paper.

The publication includes the report of the two district mine inspectors, George Blacker, state coal mine inspector, District No. 1 Cumberland, Wyo., and W. E. Jones, coal mine inspector, District No. 2, Sheridan, Wyoming.

The report of the first district describes the Susie Mine

explosion of the Kemmerer Coal Co., Jan. 20, 1912. Some important recommendations are made in the report of the second district. These include: A standard grade of miner's oil; rock stoppings for cross-entry crosscuts; precautions in the handling of powder and methods of blasting; employment of shotfirers, or electric shotfiring; daily inspection of all working places, instead of every alternate day; prohibiting use of compressed air for brushing out gas in working places; adoption of a Qualification Act, providing apprenticeship for underground employees; adoption of a suitable compensation act to avoid the present difficulties concerning the liability of employers for injuries of workmen.

**COAL-MINE STATISTICS OF STATE OF ALABAMA FOR 1911.** C. H. Nesbitt, chief mine inspector. Paper, 13 pp.; 9x12 1/2. Alabama Mineral Map Co., Birmingham, Ala.

This is a somewhat belated publication of mine statistics. It includes a statement showing the output of the largest producers in 1912, which proves that it is barely dry from the press.

The record shows the location of mines, the operating companies, superintendents, mine foremen, post-office addresses, coal thickness, seams worked, types of openings, whether the mines are gaseous or non-gaseous, number of employees, mode of ventilation, explosives used, method of mining, production in various sizes, prices paid per ton for mining, number of days worked and railroad connections, output of the different companies and the annual output since 1870.

The report is almost wholly economic and contains only a few references to fatalities. That record, though short, is not very favorable; in 1911 one man was killed, for every 108 employees, the tonnage per fatality being 71,827. The record was even worse the year before when one in every 92 employees was killed.

**COAL FIELDS OF GRAND MESA AND THE WEST ELK MOUNTAINS, COLORADO.** By Willis T. Lee. 6 1/2 x 9 1/4 in.; 219 pp. with 21 full-page plates and a few text illustrations. Pocket with a large map—U. S. Printing Office, Washington, D. C.

Without desiring to exhibit any national complacency but seeking rather to defend in all fairness our national bureaus which are assailed so unmercifully that we sometimes forget that we have abundant reason to be proud of them, we propose to compare this bulletin with the Report of the Committee on the Carboniferous Limestone Formation of the North of England.

The American report is in every respect superior. There is a careful attempt to correlate beds, the illustrations give us a correct idea of the formations, and the descriptions of the strata are much clearer and more specific. The analyses are many (88) in the American work and almost entirely absent in the English. The British report has only one analysis and that unofficial and, whereas the book of the survey has several paleontological plates, the foreign monograph has none. The map is more complete and detailed and has many valuable cross-sections. The English map is, it is true, a beautiful example of the almost unexcelled British cartography with all the clarity of color of the Philip Bartholomew maps. However, some of the clearness and color value is due, of course, to the paucity of detail.

This report of the Geological Survey is no better than the average publication of that bureau. It is not more worthy than any other of our commendation. In fact, W. T. Lee labored under some considerable disadvantages. The territory, he describes, has been only locally operated whereas the English area has been mined since 1736. One would therefore expect the British report to be far superior to the American but it is not. It is creditable to the Survey that it is able to equal and even to surpass the work done in the country where geology had not only its birth but much of its early development.

The coal described is in the Upper Cretaceous series. It is therefore comparatively recent, geologically speaking, having been ripened by the mellowing heat of the bodies of volcanic material which found vent in its midst. The coal found therefore varies from anthracite to sub-bituminous, though the area of the former is restricted. Bodies of natural coke are also found.

## COAL AND COKE NEWS

### Washington, D. C.

In spite of the hostility to many of the rates in the new tariff bill, it seems to be pretty generally conceded that there will be no interference with the determination to keep coal on the free list. It is certain that that policy will be followed throughout the time that the measure is in the House of Representatives, and careful investigation has indicated but little disposition to oppose the item in the Upper Chamber.

In addition to coal of all kinds the free list includes charcoal, coal tar, mineral salts, crude minerals not advanced in value by refining or grinding and "miners' rescue appliances designed for emergency use in mines where artificial breathing is necessary in the presence of poisonous gases, to aid in the saving of human life, and miners' safety lamps." Tar is also included in the free list.

There has been a strong demand for so long for the inclusion of coal as a non-dutiable article that the movement to remove the tariff from it would have strong support in any case. This backing is greatly strengthened, however, by the fact that within the past year there has been so much dissatisfaction regarding the price of coal and the relations between mine owners and railroads.

It is believed that the removal of the tariff, while under ordinary circumstances not very important, may affect the price of the article quite materially at times when there would otherwise be a disposition to advance the price charged the consumer, owing to domestic shortage as was the case during the coal strike of 1902. It is also believed that special benefit will be had by New England and by the Northwest, both of which regions are fairly close to the coal fields of Canada. In this way it is supposed, some portion of the effect of the reductions of duty on the products of those sections may be offset.

#### Albert C. Frost Has Been Acquitted

Information received here to the effect that Albert C. Frost, who was under prosecution in Chicago for alleged conspiracy to obtain illegal control of a large tract of coal land in the Matanuska Valley in Alaska, has been acquitted, has led to an unofficial statement that the Government has no intention of relaxing its Alaska conservation policy.

Frost and several others were indicted about two years ago for conspiracy to obtain control of 64 coal locations by the use of dummy entrymen. It was claimed that the accused had caused various employees to apply for coal lands with the intention of turning over the whole amount thus obtained to Frost.

It was pointed out here, as soon as news of the verdict was received, that this does not open the way for any further work on the claims, as the coal lands are still withdrawn from entry and will remain so until released by the Department of the Interior. The construction of the proposed road depends upon the opening of the coal lands, and is admittedly at a standstill so long as the country is closed to locators.

Alaskan interests have been eager to secure the relaxation of the Government policy with respect to the opening of the coal lands and it is expected that the verdict in this case will considerably strengthen their activity. They have desired that the subject should be taken up at the special session of Congress with a view to passing some legislation that would pave the way for what they want to do in opening up the country.

It is not believed that anything of the sort will be attempted now, but the adoption of legislation on this old question may be taken to regular session next winter. It is admitted that there should be some change in the present legal situation in regard to the opening of Alaskan lands if it is desired to have the growth of the territory proceed at all rapidly in the future.

While there is a strong conservation sentiment in Alaska there has apparently been some relaxation of feeling in recent years with respect to what are considered the somewhat overdrastic regulations on this subject.

#### Erdman Act Redrafted

A redraft of the Erdman act, framed with the purpose of extending the provisions of that legislation to mining and

other industries, involving the movement of commodities in interstate commerce, but with particular reference to mining has been completed and is understood to have the approval of the Civic Federation of New York.

This is along the lines of the bill proposed about a year ago, but is understood to have been more carefully prepared. It will probably be introduced in Congress at an early date and will be referred to the Committee on Interstate and Foreign Commerce, but it is not expected that anything will be done at the current session. Something may be undertaken next winter.

#### WILKES-BARRE, PENN.

Work on the tunnel which is to connect the Parrish Colliery of Plymouth with the Buttonwood Colliery in Hanover Township, has begun and will be rushed to completion. Mechanics are at work improving the machinery in the breaker of the latter colliery. Patent pickers, etc., are being placed and the breaker will be enlarged. If the fire in the Red Ash Vein at the Buttonwood, which has been sealed tight for the last few months, is not out by the time the tunnel is finished and breaker repairs made, a landing will be made in the shaft to the end that cars may be caged from the upper as well as from the lower veins.

The coal from the new Inman shaft of the Lehigh & Wilkes-Barre Coal Co. will also be run through the Buttonwood breaker, obviating the necessity of erecting a second structure. Surface tracks will be laid from the Inman to the Buttonwood, and the coal taken to the latter. When this work is completed, the present little Buttonwood will be one of the largest and greatest producing collieries in the anthracite region.

The Pennsylvania Coal Co. is building a new breaker at the Underwood Colliery, and work is progressing so rapidly that the officials hope to have it in operation in the early fall. Reinforced concrete and steel are being used in the construction. The main building will be of steel, and the coal and rock pockets and part of the washery will be of concrete. The washery will be located in the main building. There are many new ideas contained in the plans for the structure, prominent among them being the use of concrete for the coal and rock pockets, and the manner of their arrangement. Coal cars will be loaded directly beneath the pockets, while the box cars will be loaded outside the building, from a chute leading from the center of the bottom slab of the pocket. The width of the pockets varies from 10 ft. 8 in. to 16 ft. The walls of the pockets are designed as usual to carry that part of the load which comes from the arching of the coal in the pocket, and also to withstand the pressure against them when one pocket is full and another one empty. The pockets will have a capacity of 3500 tons. The breaker will be fed by coal from a new tract that is now being opened by the company in Throop and vicinity. It is being built by contractors Williams & Richardson.

#### PENNSYLVANIA

##### Anthracite

**Seranton**—Every colliery in the anthracite region was idle Apr. 1, while the mine workers celebrated the fifteenth anniversary of the 8-hour working day. This day is a holiday for the miners throughout the country.

**Shenandoah**—Fifty-two breaker boys at the Maple Hill colliery have struck for higher wages notwithstanding the recent agreement between the miners and operators. The company filled their places, however, and the colliery was not idle.

In a fall of top rock at the Knickerbocker colliery near Shenandoah, one miner was killed and another was fatally injured. The men had fired a shot while robbing pillars and before they could get out of the way the roof came down, completely shutting the mouth of the breast. Another accident, caused by the premature explosion of a blast, occurred at the Packer No. 4 colliery of the Lehigh Valley Coal Co. One miner was killed and another was seriously injured.

**Shamokin**—A fall of coal at the Cameron colliery, Apr. 8, caused the death of Robert Boyd, a miner. Arthur Neely, who was working with him, had a narrow escape.



**Bituminous**

**Sharon**—Two hundred and fifty miners were temporarily thrown out of work when the coal tippie and boiler house at mine No. 3 of the Filler Coal Co., was destroyed by fire.

**Apollo**—Because their demand for higher wages has been refused the employees at the Paulton plant of the Hicks Coal Co., have struck and the works have been closed.

**Charleroi**—About 1500 dock employees of the Monongahela River Consolidated Coal & Coke Co., who are employed at the marine mines of the company in Allenport, Monongahela and Elizabeth, have struck for an increase of 50c. a day. They have been receiving \$3 a day.

**Brookville, Penn.**—Mine Inspector Thomas Furniss of Punxsutawney is bringing charges of violating the mining law against John Jacob and Martin Mescavick in the Jefferson County Court. Alkinn Sheri of Brockwayville is charged by Andy Lovas with removing car checks from loaded wagons in the West Clarion mine of the Northwestern Mining & Exchange Co.

**Washington**—The Pittsburgh Coal Co. has started proceedings in the local courts against the Carnegie Natural Gas Co. to restrain the latter from drilling a well on the Gault farm in Nottingham Township.

**Connellsville**—The H. C. Frick Coke Co. has decided to establish swimming pools and gymnasiums at all its plants in this territory. Instructors will teach the employees. The tanks will be 40x75 ft. Cinder tracks will also be built at plants where track events can be held.

Efforts of a professional diver, employed by the Latrobe-Connellsville Coal & Coke Co., to enter the shaft at Derry No. 2 mine to examine the pumps buried beneath 50 ft. of water have proved unavailing. The company is renewing its efforts to pump out the water which has been flooding the mine for months.

**WEST VIRGINIA**

**Charleston**—The department of mines of West Virginia will conduct examinations for mine foremen and firebosses at the following places: May 13 and 14, at Logan; June 3 and 4, at Mt. Hope; June 18 and 19, at Charleston.

About 125 men employed at the Long Branch Coal Co.'s mine, near Mt. Hope, have struck because certain of their number were discharged for trying to induce the men to strike in a body.

Reports are to the effect that the United Mine Workers' leaders have decided to issue a call for a state-wide strike, to become effective in the near future. If this report is true, it will be the most important development in the coal trade for at least a decade. Should the suspension in West Virginia become serious, it is believed coal would advance at least \$2 a ton at the mine from Pittsburgh territory.

**Hughes**—Part of the tippie and a barge of coal belonging to the Hughes Creek Coal Co. were destroyed by fire, Apr. 7. The blaze is thought to have started from a fire which was built by some careless persons.

**St. Clairsville**—Two hundred men employed in the Purs-glove mine went on strike Apr. 8, compelling the mine to suspend operations. The trouble arose over some difficulty concerning the wage scale.

**ALABAMA**

**Empire**—The Maryland Coal Co., the new operation in the Sipsey basin, near Empire, will be shipping coal July 1. An announcement to this effect was made recently by local officials of the company. The improvement of the Maryland Coal Co. are the beginning of a development to involve over \$2,000,000 when the Panama Coal Co. makes its improvements.

**Birmingham**—It is reported that the Mine Inspectors Institute of America will hold its annual convention in Birmingham, commencing on June 10. It is expected that 100 mine inspectors of the United States, accompanied by their wives, will attend. The Institute will be welcomed to Alabama by Governor O'Neal and to Birmingham by the president of the city commission.

**Montgomery**—Former State Mine Inspector Hooper, who was recently appointed to examine into conditions at the Banner and Flat Top mines, has submitted a report commending the conduct of the Banner mine, criticising the water furnished at Flat Top and recommending that a portion of the earnings of the convicts be used for the support of their families. He declares that there is less whipping at the Banner than at any other place where convicts are worked.

In regard to the matter of ventilation used in the Flat Top, however, Mr. Hooper's opinion seriously clashes with the opinion of State Mine Inspector C. H. Nesbitt. Mr. Nesbitt

declares that the Banner mine is as safe as it is possible to make a mine.

**KENTUCKY**

**Louisville**—A recent decision of the Kentucky Court of Appeals in the case of the Bennett-Jellico Coal Co., of Artemus, Ky., against the East Jellico Coal Co., will operate almost to put the latter company out of business, as far as its present workings are concerned. The land involved consists of 146 acres and is located in the heart of the East Jellico Co.'s holdings of 1000 acres, and contains the entries opened by that company and all of the equipment used by it in the operation of the property. The East Jellico Coal Co. has consequently suspended operations and shut down the mines for an indefinite period. In the meantime it is preparing to open other entries on parts of its property not claimed by anybody else.

Several hundred miners working in the western Kentucky field have brought suit against the Illinois Central R.R. Co. for damages because of its failure to supply cars, thus throwing the men out of employment. The men ask reimbursement from the railroad for the wages which they lost by reason of the car shortage. The individual amounts are small, but the aggregate is in the neighborhood of \$100,000.

**Spottsville**—The Green River flooded the mine of the Pittsburgh Coal Co., located at this place, on Apr. 4, and on Saturday, Apr. 5, at 10 a.m. the water in the mine reached water level outside. The mine is worked by a shaft. The coal crops out above low-water mark and it is proposed that a drift be driven into the mine to drain the water, this waterway being closed in periods of flood.

**OHIO**

**Logan**—At the annual convention of Subdistrict 1 of District No. 6 of United Mine Workers, held at Logan, Ohio, recently, steps were taken to prepare for the struggle between the operators and miners on Apr. 1, 1914, when the present wage scale expires. John Moore, president, and Leo Hall, vice-president of the Ohio organization, attended the meeting.

**Crooksville**—The fan house of the Standard Hocking Coal Co. was destroyed by fire, Apr. 8, with a loss of \$650. The origin of the fire is unknown. At the time of the fire 93 men were at work in the mine, but all were brought to the surface in safety. As a result of the fire the mine has been closed down until a new fan house can be erected. One hundred and twenty-five men are idle.

**Columbus**—The Thomas resolution, providing for the appointment by Governor Cox, of Ohio, of a commission to investigate the question of wages paid to coal miners in Ohio has been finally passed by both houses of the Ohio General Assembly, and is now a law. The resolution was vigorously assailed in the senate after it had been passed by the house of representatives by a vote of 69 to 40.

In the senate the fight against the resolution was made by Democratic Floor Leader William Green, author of the anti-screen bill, which has passed the senate and is pending in the house. The matter of passing the Green bill is now up, but it is believed the bill will be allowed to rest in statu quo, because of the passage of the Thomas resolution.

**Elyria**—The loading and coal docks of the Lake Shore R.R. were destroyed, Apr. 8, by a fire which was supposed to have been started by spontaneous combustion. The docks were valued at \$50,000 and are a total loss together with 600 tons of coal.

**INDIANA**

**Boonville**—The transfer of title to 300 acres of land near here and the organization of several coal companies now in progress, means the investment of considerable capital in the coal industry in this part of Indiana. The fields hereabout have many shallow coal beds which, in the past, have been mined with great danger to the workers, from falling slate due to bad roofs and several mines were abandoned on this account. The beds run from five to twenty-five feet in thickness. The new companies will use the stripping process and the huge steam coal shovels used, after the removal of the soil from the top of the coal, are said to mine one thousand tons a day.

**Indianapolis**—The Chamber of Commerce of this city has filed a protest with the Indiana Railroad Commission against the proposed increase in freight rates for coal shipped from Indiana mines into this city, from 50 to 55c. a ton.

**Sullivan**—W. E. Woods and M. A. Haddon, of this city, have located a drill for coal on the land of Wilton Howard, Jeffersonville Township and propose to test the entire territory in the south part of Sullivan County. They have options on 16,000 acres. They will also drill test holes on a 6000-acre tract north of here and on a 12,000-acre option in Fairbanks Township.



**Evansville**—About four hundred miners employed in the Sunnyside, Crescent and Ingle mines have gone on strike because the management at the Sunnyside refused to reinstate a discharged miner. The three mines are controlled by one company.

#### NEW YORK

**Geneva**—One hundred employees at the Empire coke plant in Border City struck, Apr. 2, for an increase in wages and a shorter day.

#### KANSAS

**Pittsburg**—Mine No. 11 of the Cherokee & Pittsburg Coal & Mining Co., has been closed by the order of Francis Keegan, assistant labor commissioner. This is the largest mine in the district and employs 300 men. Mr. Keegan declared the mine to be in a dangerous condition. Refuge holes for the miners had not been provided along the haulage way, and the ventilation was poor. The officials state that they will put an extra force of men at work to make the necessary alterations and repairs.

### PERSONALS

John T. Parry, foreman at the Butler Colliery of the Pennsylvania Coal Co., at Pittston, has been transferred to the Barnum Colliery, taking the place of Thomas Huntley. The latter is transferred to No. 9 breaker, taking the place of William Wertz, who goes to the Butler.

Earl Martin, of Chattanooga, Tenn., has resigned as president of the Continental Coal Corporation, of Tennessee and Wyoming. The cause of the step taken by Mr. Martin is not definitely known. H. L. Cory, of Chattanooga, who has been vice-president and sales manager of the Tennessee branch of the company, will assume the office of president of that company, and White L. Moss, of Pineville, vice-president of the Wyoming side of the corporation, will be acting president of that company until the annual meeting of the stockholders in June.

### FORTHCOMING MEETINGS

The annual convention of the Canadian Retail Coal-dealers Association will be held in Toronto, Ont., on June 18 and 19. An especially interesting program is in preparation.

The Southeastern Passenger Association has granted special return rates for the Kentucky Mining Institute meeting to be held in Lexington, Ky., on May 16 and 17, 1913. The special return fare will be one first-class one-way fare plus 25c. Tickets will be on sale May 15, 16 and 17, and void after May 19, 1913. Fares will apply from and tickets will be on sale at all agency stations in Kentucky on the Cincinnati, New Orleans & Texas Pacific Ry., Louisville & Nashville R.R. and the Lexington & Eastern Ry., and also at various other stations in Kentucky and Tennessee.

### TRADE CATALOGS

**Stephens-Adamson Mfg. Co.**, Aurora, Ill. "The Labor Saver." Mar., 1913. 24 pp., 6x9 in.

**Williams Patent Crusher & Pulverizer Co.**, St. Louis, Mo. Catalog. Coal crushers. Ill., 46 pp., 10x12½ in.

**Ingersoll-Rand Co.**, 11 Broadway, New York. Form No. 3312. Imperial "XB" duplex power driven air compressors. Ill., 20 pp., 6x9 in.

### CONSTRUCTION NEWS

**Birmingham, Ala.**—The Mountain Valley Coal & Iron Co. is reopening its mines at Mountain Valley. The company will spend about \$20,000 in new developments, with equipment for a 400-ton capacity.

**Topeka, Kan.**—Work has been started on the new Union Pacific coal chute, west of the city. The new chute will have a 250-ton capacity, 150 more tons than could be held by the old chute, and will cost \$15,000.

**Fairpoint, Ohio**—The large coal tippie and trestle of the Provident Coal Co. has been completed and put in operation.

The structural-steel work was furnished and erected by Wm. B. Scaife & Sons Co., Pittsburgh, Penn.

**Greensburg, Penn.**—Byrne Brothers, who recently purchased the Mathias, Miller and Keller tracts of coal in Sewickley Township, have begun operations on the Miller tract. A force of men is at work driving the main entry for the mine.

**Evans Station, Penn.**—The Evans Coal & Coke Co. has awarded contracts for extensive improvements to cost about \$40,000. A new tippie and a 60-oven coke plant will be built and a coke crusher installed. The company has 1050 acres of coal still unmined.

**DuQuoin, Ill.**—Preliminary work on a new shaft of the Bell & Zoller Coal Co., at Zeigler, was begun Apr. 10. The new mine will be sunk near the famous Letter colliery and will be equipped with modern machinery throughout. The colliery will have a daily capacity of 3000 tons.

**Punxsutawney, Penn.**—The Maderia Hill Coal Mining Co. has purchased 5000 acres of coal land in the Clover Run district. A tippie will be erected at once. Surveys have been completed for a two-mile spur from the Bellwood division of the Pennsylvania R.R. to the new operation.

**Birmingham, Ala.**—The Montgomery Coal Washing & Mfg. Co. has been awarded the contract to construct a Montgomery coal washery, for the Black Mountain Coal Land Corporation, whose main offices are in Bristol, Va. The plant to be erected by the Birmingham concern will be at Pockett, Va., on the Virginia & Southwestern R.R., and will cost approximately \$25,000.

**Pittsburgh, Penn.**—A deal has just been consummated whereby the American Metal Co. has purchased 2500 acres of Pittsburgh coal and 350 acres of surface land on the line of the Pan Handle R.R., in Washington County. The American Zinc & Chemical Co., a subsidiary of the American Metal Co., is being organized under a Pennsylvania state charter to operate a new \$2,000,000 zinc smelter which will be erected at Burgettstown.

**Connellsville, Penn.**—The Connellsville Coal Co. is contemplating the erection of a modern coal-storage and sales plant at its property on South Arch St. The project calls for the erection of six 50-ton bins, a 200-ton drop open storage, a large bin for anthracite coal and a bin for coke. A switch is to be run from the tracks of the Baltimore & Ohio to the company's property. The proposed plant will have a capacity of over 500 tons.

**Stewartsville, Ohio**—The mine of the Franklin Coal Co. will be shut down for a period of five weeks. This suspension is necessitated as a result of the fire which occurred there recently, when the entire power plant was practically destroyed by flames. Plans for the new structure are now being drawn up and it is understood that the new building will be much more substantial than the old one. Officials of the company estimate that it will cost \$15,000 to replace the damage.

### NEW INCORPORATIONS

**St. Louis, Mo.**—The Imperial Coal Co.; capital stock, \$8000. Incorporators: D. G. Jackson, F. S. Suerer and B. E. Heffer.

**Punxsutawney, Penn.**—The Lorenze Mining Co.; capital stock, \$25,000. Incorporators: F. A. Lorenze, J. W. Wingert and J. G. Adams.

**Pueblo, Colo.**—The Smith-Tanner Coal & Mining Co.; capital stock, \$50,000. Incorporators: G. T. Ortner, L. F. Schumm and V. G. Garnett.

**St. Louis, Mo.**—The Universal Smokeless Fuel Co.; capital stock, \$50,000. Incorporators, Jas. M. Moran, A. A. Loudon and Alfred Mueller.

**New York, N. Y.**—The Mineral Lands Co.; to acquire, own, use, develop, sell and deal in lands containing ores, minerals and stone; capital stock, \$100,000.

**Boston, Mass.**—A firm has been incorporated under Massachusetts laws as the Staples Coal Co., of Boston, with an authorized capital of \$1,000,000.

**New York, N. Y.**—The R. J. Buchholz Coal Co., Inc.; to deal in coal and fuel; capital stock, \$25,000. Incorporators: R. J. Buchholz, C. E. Buchholz, J. V. Koch, Jr.

**Mt. Sterling, Ohio**—The Barner Coal Co.; capital stock, \$32,000. Incorporators: Lewis Apperson, W. C. Taylor, J. W. Clay, M. C. Clay, R. T. Judy and J. A. Judy.

**Mingo Junction, Ohio**—The Brettelle Bros. Co., of Mingo Junction, Ohio, has been incorporated, with a capital stock of \$25,000, to mine and deal in coal. The incorporators are Thomas Brettelle, Sr., W. M. Brettelle, M. Brettelle, George L. Thompson and James Brettelle.

## INDUSTRIAL NEWS

**Dorchester, Va.**—The Wise Coal & Coke Co. recently ordered two five-ton, 44-in. gage electric mining locomotives from the General Electric Co.

**Fairmont, W. Va.**—The Consolidation Coal Co. will add to its equipment two 10-ton electric mining locomotives recently ordered from the General Electric Co.

**Pottsville, Penn.**—A Massachusetts manufacturing firm has purchased the only loose tract of coal land lying untouched in Kline Township. The consideration was \$45,000.

**Huntington, W. Va.**—The local plant of the American Car & Foundry Co. has received an order from the Baltimore & Ohio R.R. for the construction of 500 all-steel hopper coal cars.

**Elders Ridge, Penn.**—The Iselin mines of the Rochester & Pittsburgh Coal & Iron Co., recently loaded 2058 two-ton mine cars in one day. This coal-loading feat was accomplished in ten hours.

**DuQuoin, Ill.**—A large block of coal weighing 4000 lb. was recently taken from the Paradise mine and shipped to Cairo. It was 6 ft. 9 in. high, 42 in. square at the base and 21 in. square at the top.

**Chicago, Ill.**—The By-Products Coke Corp. will install one 70-hp. and three 135-hp. motors in connection with new belt conveying systems. The motors will be furnished by the General Electric Co.

**Johnstown, Penn.**—The Black Lick Mining Co., for 20 years operating at Big Bend, has gone into the hands of a receiver, a Philadelphia man having been named to settle the firm's financial affairs.

**Big Stone Gap, Va.**—The Stonega Coal & Coke Co. will place in operation in its mines four new four-ton, 250-volt, 44-in. gage electric mining locomotives recently ordered from the General Electric Co.

**Boswell, Penn.**—At a meeting of the stockholders of the Standard Quemahoning Coal Co. the old directors and officers were reelected. Plans for future development of the company's fields near here were discussed.

**Boonville, Ind.**—W. T. Blair has recently bought 400 acres of coal and expects soon to start operations at surface mining. Mr. Blair is said to represent Chicago and Indianapolis capitalists. The price paid for the land was \$40,000.

**Johnstown, Penn.**—Options for 1700 acres of coal land in Indiana County, between Vintondale and Strongstown, which were taken by Dr. Charles E. Altemus, may result in the development of this large territory within the next year.

**Lorain, Ohio**—The United States Steel Corporation's new freighter "James A. Farrell," built at the Lorain yards of the American Ship Building Co., was given its trial trip recently and will be used in coal trade after the lake season opens.

**Greensburg, Penn.**—John G. Felger, of Greensburg, has been inspecting property which he owns in Sewickley Township. Tests are being made of the underlying seam of Pittsburgh coal, preparatory to sinking shafts for the mining of the coal.

**Morgantown, W. Va.**—J. A. Martin, owner of the Terra Alta electric-lighting plant, has sold that property to W. F. Patterson, of Waynesburg, Penn., in exchange for 1000 acres of coal in Monroe County, Ohio. The deal involves approximately \$50,000.

**Pittsburgh, Penn.**—The Belmont Coal Mining Co. will add to the electrical equipment in its power plant 200-kw. and 300-kw. two-unit, three-bearing motor-generator sets and switchboard. The machines have been ordered from the General Electric Co.

**Mt. Pleasant, Penn.**—M. F. Byers has sold his farm, which is underlaid with valuable coal, about a mile from Central, to Isaac Brownfield, of Uniontown. Mr. Brownfield tendered in payment 2050 acres of coal land in Marshall County, West Va., and \$74,000 in cash.

**Logan, Ohio**—According to a decision recently made by the public service commission, the Hocking Valley Ry. Co. must pay the Colonial Coal & Supply Co., of Columbys, the value of 11,020 lb. of coal alleged to have been lost in a shipment from Pomeroy to Lima.

**Scottsdale, Penn.**—A tract of 2500 acres of coal in the Ohio valley, near Wellsburg, W. Va., has been sold for \$600,000. The tract was being operated by Messrs. Stauffer, Braddock & Hough under the name of the Beech Bottom Coal Co. The sale included the plant with a daily output of 1000 tons.

**Pottsville, Penn.**—Excavating for cellars for new dwellings on the property of S. A. Hogan, workmen discovered the outcrop of a vein of fine coal. The vein is 15 ft. thick, but being so near the surface and directly underlying Pottsville's new residential section, it will be impossible to mine it.

**Dorchester, Va.**—The N. Y. Mining & Mfg. Co. will increase its power-plant capacity by the addition of a 1250-kv.a. Curtis turbo-alternator with 15-kw. turbo-exciter, three 150-kv.a. transformers and switchboard. The apparatus will be supplied by the General Electric Co., which corporation will also install the plant.

**Pond Creek, Ky.**—The Pond Creek Coal Co., which controls a large acreage in Pike County, Ky., is reported to be arranging for a bond issue of \$2,000,000 for the purpose of providing funds for the development of its properties. The company already has seven mines in operation and plans three additional openings.

**Johnstown, Penn.**—John Lochrie, of Windber, has taken over a lease of the 400 acres of rich coal near Dunlo, owned by Matthew Calvin and Eliza C. Smith, of Hollidaysburg. Mr. Lochrie is to mine a minimum of 2000 tons a month for one year after beginning operations and a minimum of 4000 tons after the first year of mining.

**Des Moines, Iowa**—Supervisors James B. Uhl, C. W. Keller and Harry Barquist have been appointed to enter into a contract with the Bloomfield Coal Co. for the leasing of the coal under the Polk County farm. A royalty of 10c. per ton has been agreed upon with the stipulation that, if the third vein is directly under the shaft of the mine, the board expects an income of \$40,000 from the deal.

**Erlington, Ky.**—The St. Bernard Mining Co. has arranged for equipping its power station and mines with new electrical apparatus consisting of a 500-kw. Curtis turbo-alternator, a 200-kw. Curtis turbo-generator set, a 14-kw. induction motor-generator exciter set, 100-kw., 150-kw. and 200-kw. synchronous motor-generator sets, and switchboard. All the apparatus will be built by the General Electric Co., which will make the installation.

**Louisville, Ky.**—After recovering rapidly from the slight setback caused by high water, the coal mines on the Lexington & Eastern in eastern Kentucky and in the Letcher County field, recently opened by the Consolidation Coal Co., are increasing their output daily, and expect soon to be operating at the maximum. The Consolidation company is shipping nearly all of its Letcher County coal to Gary, Ind., for the use of the U. S. Steel Corporation's plant at that place.

**Joliet, Ill.**—The Laclede Gas Light Co. has awarded to the Koppers Co., of Joliet, the contract for the installation of a new \$5,000,000 byproduct coke-oven plant, to be located in South St. Louis at the junction of the River Des Peres and the Mississippi. Work will start in the course of the next three weeks. The coal to be used will be brought from West Virginia fields by water in barges via the Ohio and Mississippi Rivers, and a special dock for unloading barges will be built.

**Camden, Ark.**—Considerable activity in the development of the lignite deposits in this vicinity would indicate that in the course of the next two years large investments will be made in mines west of this place. Local parties are planning the organization of a \$1,000,000 corporation, to develop coal and clay properties in Ouachita County.

A party of Little Rock people is organizing a similar company for the development of lignite and clay properties in Ouachita and Nevada Counties.

**Jenkins, Ky.**—The Chesapeake & Ohio Ry. has let the contract for the construction of its 22-mile Beaver Creek extension, reaching from the mouth of Beaver Creek to Steele's Branch, Jackson County, Ky. The branch will tap a rich coal and timber section, and its completion will be followed by an industrial development similar to that which has been seen in Harlan County in the past two or three years. The cost of the line will be about \$10,000 a mile, but the amount of grading and trestle work necessary is expected to run the total cost to nearly \$300,000. The firm of Ballard, Herring & Severer, of Jenkins, Ky., received the contract.

**Moundsville, W. Va.**—The big river tippie at the Fort Pitt coal mine in Belmont County, Ohio, which was carried away by high water three weeks ago, will not be rebuilt. The company has been making but few shipments by water during the last few months and it has been decided that all will be discontinued from now on, owing to the fact that it is not considered profitable to build a new tippie in consideration of the small returns. All shipments will be made by the Cleveland & Pittsburgh division of the Pennsylvania line, which runs by the mine. It is likely that improvements will be made on the railroad tippie in order that the full production may be handled through this source without delays.



## COAL TRADE REVIEWS

### GENERAL REVIEW

The hard-coal companies appear to have all the business they can possibly handle as is usually the case in April when the minimum anthracite prices are in effect. There is a general shortage on all the domestic grades, with broken probably in the greatest demand; pea is the shortest of the steam sizes. The difficulty in obtaining supplies last fall has tended to stimulate an early buying this season.

Some of the Coastwise soft-coal agencies are still apprehensive over the labor situation in West Virginia, but this has not effected any tangible improvement in the market so far. Buyers generally are not responsive and usually more than small concessions are necessary to interest them. There is quite an amount of coal on hand, inland, although this is slowly moving off, but probably at low quotations; many prices are being asked and predictions into the future are confusing. The heavy consumption has undoubtedly been the controlling feature in maintaining prices, and operators continue to hold firm; it is not believed that the discounts of the smaller companies are having any material effect upon the market.

Shipments out of the Pittsburgh district into Ohio and beyond are still considerably restricted, but the Lake service is probably up to full requirements. Prices are holding well, except on small business, which is a trifle irregular and production is greater than at any time since the Lakes closed, fully 75 per cent. of full rated capacity. Order is being gradually restored out of the chaos in Ohio, and conditions are again slowly becoming normal. The movement continues uncertain, but embargoes are being lifted rapidly, and it is now possible to get rail connections to all Ohio points. Operations have been severely restricted because of the lack of transportation facilities, conditions in the Hocking Valley having been generally better in this respect than at other points.

In the Southern market there is a temporary rush of orders for steam sizes, consumers fearing that the floods may cut them off from supplies as has been the case on other occasions. The movement into Chicago is far below normal, only a few of the Illinois mines being able to ship; the main supplies for the time being are coming from the Hocking Valley district. The Terre Haute, Ind., mines, which were closed for two weeks, are again working, but many other operations are still unable to get cars; fortunately, the demand, especially for manufacturing, is also restricted.

### BOSTON, MASS.

**Bituminous**—Reports on the labor troubles in the New River district are received here with much interest. The union seems to be gaining in membership from day to day and several of the important mines are affected. The practice of the mine-workers buying land to camp on has put a new face on the situation. Some of the agencies appear to be apprehensive of trouble but so far there have been no signs that the market has in any way improved. A good volume of coal is being sold off-shore but there is no slackening up of effort to place coal here. Buyers are not responsive and with the present state of trade it will take more than small concessions to interest them. The call for Pocahontas and New River for spring shipment will depend very largely on the outcome of the negotiations in West Virginia.

Georges Creek mines are in good shape with an ample business and a large output. There has been some hesitation on the part of the regular buyers of this grade on account of the differential asked this year over Pocahontas and New River, but it remains a popular coal.

There is only a small movement of Pennsylvania coals at tidewater this month. A good tonnage is usually moved in conjunction with anthracite, particularly from Philadelphia, but retailers are apparently confining themselves to the latter for the present. All-rail there is fair business for coals from the Cambria districts and from the better known operations in Clearfield, but otherwise there is only a light demand.

**Anthracite**—April is not turning out such a disappointment as was feared. The companies appear to have all the business they can handle and there are even notable shortages in sizes like broken and pea. Dock screenings are also hard to get and distributors at this end are getting more interested in hard coal as the weeks go on. Inland, there are

so many that were in difficulty last year that with the spring price in their favor they are trying to get their coal forward this year as early as possible. A decided improvement can be reported in that respect over a week ago. At least one of the originating companies that stayed out of New England last year is planning to do the same in 1913, on account of a largely increased demand from the West. That situation helps keep the other shippers well supplied with orders. Dealers here have become so accustomed to entering requisitions to be filled on short notice that already some of them find themselves out of certain sizes.

Current wholesale quotations are about as follows:

Clearfields, f.o.b. mine.....	\$1.00@1.35
Clearfields, f.o.b. Philadelphia.....	2.25@2.60
Clearfields, f.o.b. New York.....	2.55@2.90
Cambrias, Somersets, f.o.b. mines.....	1.25@1.55
Georges Creeks, f.o.b. mine.....	1.67@1.77
Georges Creeks, f.o.b. Philadelphia.....	2.92@3.02
Pocahontas, New River, f.o.b. Hampton Roads.....	2.75@2.85
Pocahontas, New River, on cars Boston.....	3.70@3.85
Pocahontas, New River, on cars Providence.....	3.40@3.70

### PHILADELPHIA, PENN.

Dealers here are reporting a slight improvement in the demand for anthracite, but the difference is trifling, and is undoubtedly due to the damp and unpleasant weather prevailing here for almost a week. The companies, however, still continue mining at full time, and it is understood that most of the prepared sizes are being readily taken up, but all that is moved to the retailer is not sold, by any means. Quite a number of the dealers, whose demand for a certain size, say egg, is not great, will possibly get a supply in April that will about carry them over until fall of next year, and the same is sometimes true of the other sizes, particularly buckwheat and rice. The market, from a wholesale point of view, is good, although still lacking the snap that usually characterizes April business. While some new business is reported, orders are not coming in as rapidly as they would like to see them, but they all claim to see business ahead for at least the next three or four weeks.

The bituminous situation shows little or no improvement. Cheap coals are almost a drug in the market, and the better grades are selling, in some cases, at prices that probably net the operators less than the cost of production. Many contractors are still holding out for better figures, and with the prospects fair that they will secure them, if conditions do not change.

### NEW YORK

**Bituminous**—While there is no tangible evidence of any material improvement in the local soft-coal market, there is undoubtedly an optimistic undertone that is having a steadying and beneficial effect on the trade. This is particularly true on contract business. Consumers are showing a greater willingness to close and there has been much business signed up during the past week; in fact, the companies generally report that nearly all contracts which expired the first of the current month have been renewed, and that they are not interested in further contract business unless same presents some unusually desirable features. Prices for the new contract year showed a general increase without exception, varying from 5@15c. above last year's figures.

In the prompt market there is no pressure to sell and inquiries seem to be on the increase. Supplies at tide are rather below normal. Mines are reported to be working about two-thirds capacity, some curtailment still being evident; the railroad movement is good, and plenty of cars are available. Prices have not undergone any change, although they are probably somewhat firmer on the same basis as last week as follows: West Virginia steam, \$2.55@2.60; fair grades, Pennsylvanias, \$2.65@2.70; good grades of Pennsylvanias, \$2.75@2.80; best Miller, Pennsylvania, \$3.05@3.15; Georges Creek, \$3.25@3.30.

**Anthracite**—There are no indications of any letup in the demand for hard coal, and it is probable that this will continue in excess of the production throughout the balance of the month, as is usually the case in April. Production is up to full rated capacity and all the tonnages are going immediately into the consumers' storage bins. The car supply is a trifle short but not sufficiently so as yet to materially affect production. The heaviest demand is centering on stove, although all the domestic sizes are about equally active; the



steam grades are also quite strong, particularly rice, and the companies are, in some instances, drawing upon their storage supplies for these grades.

Interest in the Eastern markets is being shown in the situation in the Northwest, where the supplies on the docks are almost entirely depleted. This means that Lake shipments, and those to the West generally, will be unusually heavy during the coming season, while consignments to the Eastern points will be correspondingly lighter; in fact, one company has withdrawn entirely from the New England trade, in order to concentrate its entire attention upon the Western market. We quote the nominal New York market fairly strong and active on the following basis:

	Circular	Individual	
		Lehigh	Seranton
Broken.....	\$4.50	\$4.45	\$4.50
Egg.....	4.75	4.70	4.75
Stove.....	4.75	4.70	4.75
Chestnut.....	5.00	4.95	5.00
Pea.....	3.50	3.35@3.45	3.50
Buckwheat.....	2.75	2.25@2.45	2.50@2.75
Rice.....	2.25	1.95@2.05	2.25@2.35
Barley.....	1.75	1.50@1.70	1.60@1.75

#### PITTSBURGH, PENN.

**Bituminous**—Coal shippers have been securing almost full service from railroads for lake coal, but shipments to various points in Ohio and beyond are still considerably hampered. Production in the Pittsburgh district is greater than at any time since Lake shipments closed last season, and probably exceeds 75 per cent. of capacity. Prices are well maintained by leading shippers, with occasional irregularities among the small ones. Slack rarely commands a premium, now that the Lake trade has begun. We continue to quote: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in., \$1.55, per ton at mine, Pittsburgh district.

**Connellsville Coke**—The coke market shows more stiffness than might be expected, after so serious an interruption to shipments as was caused by the floods. The regular quoting basis on prompt furnace is \$2.25, this being shaded only occasionally on small lots, while on contract the operators speak confidently of obtaining \$2.50. There is, however, no contract market, there being practically no inquiry even, and an actual inquiry would probably develop weak spots, as was the case in the last contract placed, some three weeks ago, when \$2.25 was done for shipment to July 1. Furnaces uncovered for second-half are quite indifferent and naturally so, as they see a constantly falling pig-iron market, and scarcely any demand. We quote: Prompt furnace, \$2.25; contract furnace (nominal) \$2.25@2.50; prompt foundry, \$3@3.50, and contract foundry, \$3@3.50, per ton at ovens. Indifferent grades of foundry coke could possibly be picked up at slightly lower figures.

#### BALTIMORE, MD.

The continued movement of traffic westward to await the opening of Lake business was the only feature of interest during the week. Local operators depend largely on this Western business to tide them over the dull period in the East, and the Lake trade promises to show a substantial increase this year. The Eastern situation has undergone but little change. The demand for coal is still light, the supply has not been large and the report is current that some of the smaller mines were shutting down.

More consumers renewed their contracts during the week, but there are still many who are holding out, preferring to take their chances in the spot market. In the face of the quiet market at this time optimistic predictions for future business are heard.

Spot business here is certainly not booming, due to the large supplies purchased by consumers during January and February, when it was thought that severe weather would be experienced. These consumers are still drawing on their supply, and consequently have no occasion to enter the market. The coke market is quiet, the supply being gradually reduced to meet light demand.

#### BUFFALO, N. Y.

There are a good many prices asked for bituminous coal and predictions as to the future of the trade differ widely. The seller who has held his prices firm and expects to continue doing so does not believe that the low prices here and there are likely to have any influence on the general trade. If a few operators want to give their coal away they certainly cannot be prevented. For all that the consumer is buying sparingly; he is not going to pay 15c. or 20c. more for coal than he has to. It is not denied that a good part of the cheap coal is low in quality, but there is enough of it that is good to keep the consumer uncertain as to the future.

There is nothing but the heavy consumption all along the line that keeps prices at all firm. There is really enough being used to enable the sellers to maintain prices, but dealers

hear rumors that competitors are cutting and start doing likewise themselves, when it is quite likely they are the only ones cutting. Some time ago there was quite an amount of coal on track here, but it is now said to be sold at pretty low prices, it is believed.

Reports from the Canadian trade are favorable to a heavy movement in that direction. The industries there are well kept up and there is plenty of money available. Collections in Canada are said to be satisfactory. The Eastern trade is not so strong, but it would be good if the cheap salesman would stay away.

Pittsburgh is holding prices firmest. A big Lake trade is opening and rumors are current that some of the heavy operators refuse to make quotations to new inquirers. With such possible competitors out of the way it ought to be rather easy to keep the market firm. Quotations remain at \$2.80 for Pittsburgh lump, \$2.65 for three-quarter, \$2.55 for mine-run, and \$2.15 for slack. Coke is still rather quiet at \$5 for best Connellsville 72-hr. foundry. Allegheny Valley coal is about 25c. below Pittsburgh. Side coals, such as smithing and cannels, are not much affected by other fluctuations and prices have not changed lately.

The demand for anthracite is light. March and April have not made much inroad on the supplies, so that consumers have quite an amount on hand and do not care to buy now, even at the reduced prices.

#### COLUMBUS, OHIO

After several weeks of demoralization, the coal trade is again showing signs of becoming normal. One of the results of the flood was a rush of small orders for domestic grades and this is having a good effect on the trade generally. There is also a fair demand for steam sizes and taking it all in all the outlook for the future is considered excellent.

Prices have strengthened materially although there has not been any special advance excepting in the small sizes; other grades are sold at the circular figures. Concessions off of the list are infrequent and most of the operators and jobbers are inclined to maintain the circular figures.

Railroad traffic is still somewhat uncertain but officials are making every effort to remedy the situation. Embargoes have been the rule and the work of shipping required calculation. But toward the latter part of the week the embargoes were gradually removed and it is now possible to reach practically every point in Ohio through some railroad or other. Springfield, O., was about the only large town where there was any great shortage of coal and this situation is now relieved. The shortage at no time amounted to a coal famine.

Operations have of course been much restricted by the lack of transportation facilities. The greatest activity is shown in the Hocking Valley because the roads were best able to handle the output from that district. Lake trade is close at hand. A number of bottoms have been loaded and will leave the ports of the lower Lakes just as soon as navigation is formally opened which will be shortly after Apr. 15. Word received from the upper Lakes shows considerable ice in the Soo, although efforts are now being made to break the ice by means of tugs. There is an extraordinary Lake demand in prospect for the summer.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawh
Domestic lump.....	\$1.50	.....	\$1.50	\$1.50
2-inch.....	1.35	\$1.35	1.35	1.30
Nut.....	1.20	.....	1.25	.....
Mine-run.....	1.15	1.10	1.15	1.10
Nut, pea and slack.....	1.00	.....	1.00	1.00
Coarse slack.....	0.90	0.85	0.90	0.85

#### BIRMINGHAM, ALA.

One interesting feature of the local coal market is the rush of orders for steam coal by some of the railroads west of the Mississippi who have contracts for Alabama coal. It is feared that the floods of last year will be repeated; at that time some of the roads were caught short of fuel on account of their inability to get coal across the flooded territory.

There is no apparent change in the domestic market since our last report. We give below schedule of prices covering Carbon Hill domestic coal for the coming season:

Month	Fancy Lump	Nut
April.....	\$1.75	\$1.45
May.....	1.85	1.55
June.....	1.90	1.60
July.....	1.95	1.65
August.....	2.00	1.70
September.....	2.15	1.75
October to February, inclusive.....	2.25	1.90

The market for both foundry and furnace coke is active and high prices are maintained. All of the producers are sold up for several months ahead and an inquiry for 100 cars for nearby shipment found no bidders although it was stated they were willing to pay \$4 f.o.b. local ovens.

**LOUISVILLE, KY.**

The coal business in this vicinity was virtually brought to a standstill by the flood, but the railroads are slowing resuming operations again, although the road beds are in a precarious condition.

The Louisville, Henderson & St. Louis which handles the large proportion of the Western Kentucky production is once more getting under operation, but the movement is still uncertain. In the same field the Illinois Central is in somewhat better condition and its movement East is fairly prompt but the service for the South is badly crippled by the floods in the Mississippi Valley. In the Eastern Kentucky fields the situation is much better. The roads generally are not so accessible to flood waters and little trouble was experienced in rapidly repairing what little damage was done.

The damage to the mines was comparatively insignificant and there will be few if any protracted shut-downs due to loss of equipment or water in the workings. The great congestion of traffic at all the important junction points appears to have been the most serious result of the flood. The service is still badly demoralized at a number of points and the work of getting cars moving again is going forward slowly. The congestion of coal is particularly acute. While the physical condition of the roads is such that there seems to be no reason for further delays there is a paralyzing confusion that seems to make the efforts of the operating departments ineffective.

Because of the large number of cars tied up and not available for use an actual shortage of equipment has developed. The Kentucky product is being called upon to supply markets which usually belong to the West Virginia operators. A prominent Kentucky operator recently shipped 30 box-cars of the best block coal to Seattle, Wash., the freight rate on which was between \$10 and \$11 a ton.

The heavy demand and short supply of nut and steam grades has resulted in an advance on these to as high as \$1.10. Western Kentucky lump can be had from \$1.10 to \$1.25, domestic nut from \$1 to \$1.10, with nut and slack strong at 75 to 85c. and not much available.

**KNOXVILLE, TENN.**

Business in this district is considered fairly good for this period of the year. While the advance in prices, as compared with other states, and even with adjoining competing districts is somewhat less, still most steam contracts are being closed on an average of about 10c. higher than last year's figures and operators appear satisfied. The domestic consumption has been comparatively light due to the persistently warm weather over the past two or three months, but the steam grades are in strong demand and the surplus domestic is being diverted into the steam market.

The excessive domestic production which always occurs through May and June appears to be pretty well covered; contracts have been rather harder to close. Local operators are taking considerable pains with their preparation and this, together with a rather extensive campaign for business, and the high grade of the coal, has created a very strong and consistent demand for these fuels.

**INDIANAPOLIS, IND.**

Many of the mines of the state are still shut down because of inability to get cars and the movement to Indianapolis and to some of the other large cities is small. Railroads are repairing flood damage as fast as possible, but scores of bridges were carried away and the work of rebuilding will be slow. Where parts of them only were damaged, repairs will soon be made and some have already been fixed.

On account of the high water and restricted railroad service, hundreds of factories were shut down or are now working part time and this relieves the pressure for coal. The weather has not been severe and the domestic demand has not yet cleaned up stocks in retail yards, the mild winter leaving these still of ample proportions.

In the Terre Haute district, mines that were closed for two weeks during the worst of the flood and its aftermath are in operation again, as some cars are being furnished. While here and there a premium is offered, no advantage is being taken by operators or retailers of the shortage condition in particular places and summer prices prevail at the mines.

**DETROIT, MICH.**

There is a reverse condition existing here from last week; the consumers of steam coal seem to be all over stocked by the abundance of fuel that is arriving daily, some of the railroads being forced to auction several cars off for demurrage. They are now requiring the shippers to stop all shipments so that they can work their stocks down and clean up for the spring.

It is thought by the operators that this will give them an excellent advantage on prices for contracts in the future.

Pocahontas is the only coal that is showing any strength just now, however, as retailers are very slow in the matter of stocking up on domestic soft coal.

The market is dull at present, and only those who are forced are buying coal. The following quotations for today are as follows, f.o.b. mines:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8	Pocahontas	Jackson Hill
Domestic lump	\$1.40	.....	.....	.....	.....	\$2.25	\$1.75
Egg	1.40	.....	.....	.....	.....	2.25	1.75
Nut	1.30	.....	\$1.30	.....	.....	.....	.....
14-in. lump	1.15	.....	.....	.....	.....	.....	.....
4-in. lump	1.05	\$1.05	1.05	\$1.05	\$1.05	1.25	.....
Mine-run	0.95	0.95	0.95	0.95	0.95	.....	.....
Slack	0.75	0.75	0.75	0.75	0.75	1.00	.....

The coke situation here has fallen off quite materially in the last few days because of the slight demand. Connells-ville is being quoted at \$2.80 Semet Solvay \$3, and Gas House \$2.75; f.o.b. the ovens.

**CHICAGO**

The amount of coal available for Chicago delivery is far below normal, due to the recent floods in Ohio, Indiana and Illinois. The main source of supply at the moment is the Hocking district of Ohio, that part of Indiana north of the Wabash River and from a comparatively few mines in Illinois. Chicago dealers report a temporary rise of prices for spot coal and diminished storage piles.

Domestic coal is being sold largely for steam-making purposes and commands mine-run prices; mine-run is bringing from \$1.10 to \$1.25. Retail dealers are paying \$1.25 for central Illinois coal and \$1.35 for the southern product. Eastern coals coming into this market include Hocking, Pennsylvania smokeless and anthracite. The coke market temporarily is strong and byproduct coke has been fairly active during the past few days at \$5@5.25. A few shipments of Connellsville coke have been made and the price is firm at about \$6 delivered.

Prevailing prices in Chicago are:

	Sullivan Co.	Springfield	Clinton	W. Va.
Domestic lump	\$2.47	\$2.07	\$2.27	.....
Egg	2.47	.....	.....	\$3.95
Steam lump	\$2.12 @ 2.37	1.92 @ 1.97	2.17	.....
Mine-run	.....	1.87 @ 1.92	1.97	3.30
Screenings	1.77 @ 1.82	1.77 @ 1.82	1.77	.....

Prevailing prices for coke are: Connellsville and Wise County, \$6@6.25; byproduct, egg, stove and nut, \$4.45; gas house, \$4.75@4.85.

**ST. LOUIS, MO.**

There is no change in the local situation, with the possible exception that a few of the operators are beginning to realize that they are losing money, and are asking a trifle more for coal. Franklin County coal is being sold on the local market at perhaps the lowest price of any high-grade coal.

The Standard market is still struggling along against odds. The past week has seen the price of screenings jump from 60 to 90c. on account of the poor demand for the screened sizes. With this exception there has been no change in prices.

The circular is:

	Cartersville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	\$0.90
3-in. lump	.....	.....	\$1.25	.....
6-in. lump	\$1.20 @ 1.25	.....	1.35	1.10
Lump and egg	1.25	\$2.25	.....	.....
No. 1 nut	1.10 @ 1.15	.....	.....	.....
Screenings	0.95 @ 1.00	.....	.....	\$0.85@0.90
Mine-run	1.05 @ 1.15	.....	.....	0.85
No. 1 washed nut	1.35	.....	.....	.....
No. 2 washed nut	1.35	.....	.....	.....
No. 3 washed nut	1.35	.....	.....	.....
No. 4 washed nut	1.35	.....	.....	.....
No. 5 washed nut	1.00 @ 1.05	.....	.....	.....

**OGDEN, UTAH**

March finished with all the mines working every day. This increased demand for coal during the latter part of the month resulted in a production that was not expected. The first 20 days were very discouraging and had it not been for the storms that visited the West, March would have been a poor month. April is starting out well as there is not much coal in storage and also because of the reduction in quotations for shipments to Nebraska. No doubt the demand for Rock Springs coal will steadily increase until this market will again become normal. This will be a great relief to the Wyoming operators as Kansas and Nebraska have been a source of annoyance.

Prices remain unchanged as follows, with nut and slack selling below circular prices: Lump, \$2.25; nut, \$1.75; mine-run, \$1.75; slack, \$1 for Nebraska and Kansas. Lump, \$2.75; nut, \$2.25; mine-run, \$1.85, and slack, \$1, with Utah slack \$1.25 for shipments to the Northwest.



## PRODUCTION AND TRANSPORTATION STATISTICS

### ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for March and the first three months, of the years 1912-13, in long tons:

	March		3 Months	
	1913	1912	1913	1912
Phila. & Reading.....	976,712	1,472,696	3,399,293	3,861,766
Lehigh Valley.....	829,502	1,225,019	3,066,782	3,329,391
Cent. R.R. N. J.....	665,856	848,110	2,240,293	2,393,145
Del. Lack. & West.....	532,247	916,824	2,217,917	2,491,221
Del. & Hudson.....	562,440	578,983	1,782,988	1,718,283
Pennsylvania.....	429,211	537,470	1,496,825	1,603,828
Erie.....	700,388	761,742	2,073,542	2,154,850
Ont. & Western.....	212,932	228,843	642,236	656,867
Total.....	4,909,288	6,569,687	16,919,876	18,209,351

**Stocks at Tidewater** at the close of March were 772,115 tons as compared with 484,270 tons on Feb. 28.

### CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic over the lines of the C. & O. Ry., for February, and the eight months ending Feb. 28, 1912-13, in short tons:

Destination	February		Eight Months			
	1913	1921	1913	%	1912	%
Tidewater.....	323,469	299,459	2,391,580	22	2,605,213	22
East.....	220,991	190,655	1,739,689	16	1,472,804	13
West.....	671,742	971,416	6,109,197	57	7,456,874	63
Total.....	1,216,202	1,461,530	10,240,466		11,534,891	
Coke.....	29,643	91,579	195,343		147,616	
<b>From connections</b>						
Bituminous.....	88,546	17,650	423,111	4	153,890	1
Anthracite.....	1,480	4,742	8,829	1	26,646	1
Grand total...	1,335,871	1,503,501	10,867,749	100	11,863,043	100

### THE CAR SITUATION

The net surplus of idle coal cars shows an increase of about 40% over the two previous statements. American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Apr. 1, as follows:

	Surplus	Shortage	Net*
New England Lines.....	321	0	321
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.....	4,303	182	4,121
Ohio; Indiana; Michigan; Western Pennsylvania.....	1,215	554	661
West Virginia, Virginia, North & South Carolina.....	1,574	400	1,174
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida.....	1,412	150	1,262
Iowa, Illinois, Wis., Minn.; North & South Dakota.....	3,368	55	3,313
Montana, Wyoming, Nebraska.....	1,453	15	1,438
Kansas, Colorado, Missouri, Arkansas, Oklahoma.....	2,792	0	2,792
Texas, Louisiana, New Mexico.....	635	33	602
Oregon, Idaho, California, Arizona.....	3,009	0	3,009
Canadian Lines.....	127	11	116
Totals.....	20,209	1,400	18,809
Greatest surplus in 1912 (Apr. 25).....	94,692	2,144	92,548
Greatest shortage in 1912 (Oct. 10).....	6,491	14,897	8,406

\*Bold face type indicate a surplus.

## FOREIGN MARKETS

### GREAT BRITAIN

**Apr. 4**—A great improvement has taken place in the demand for all descriptions of coal. Prompt supplies are very scarce and dear, while for forward shipment values are stiffening further all round.

Quotations are approximately as follows:

Best Welsh steam.....	\$4.80@4.92	Best Monmouthshires.....	\$4.44
Best seconds.....	4.68@4.80	Seconds.....	4.32
Seconds.....	4.56@4.68	Best Cardiff smalls.....	3.78
Best dry coals.....	4.56	Seconds.....	3.60

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of warfage, and for cash in 30 days—less 2½%.

## FINANCIAL DEPARTMENT

### Pittsburgh Coal Co.

Chairman M. H. Taylor reports under date of March 11, as follows:

**Results**—The total tonnage produced and handled, including coke purchased and exclusive of coal purchased by the subsidiary companies, was 18,363,417 net tons, an increase of about 14%. The gross earnings from all sources increased \$382,558, or 9.46%, and the net earnings after interest charges and full depreciation were \$2,025,483 (an increase of \$633,545, or 45.52% on the preferred stock.

Demand caused by favorable weather conditions and the uncertainty attending the biennial miners' wage-sclae settlement materially improved tonnage and earnings for the first quarter of the year. Then followed idleness for three weeks in April, pending scale adjustment. When the mines resumed, contracting was done under sharp competition from all districts at prices at which the bulk of the production for the year was moved. This, with floods, shortage in labor and car supply, limited the advantage that otherwise would have been received under the better trade conditions of the last half of the year.

The increase in net earnings is partly due to a small increase in the average selling price of the product f.o.b. mines, and from better dock and agency returns. Labor mine costs were increased under the wage scale adjustment of Apr. 1. Practically all of the betterments on the mines for the year have been charged to operation, as has also full depreciation. Floods during the spring and summer caused severe losses in property.

The undivided earnings account now stands at \$9,153,434.

**Finances**—The working capital Dec. 31, 1912, was \$4,573,679, a net increase of \$267,275. There are no outstanding obligations for borrowed money, either by this company or any of its subsidiaries, and the floating debt is chiefly for accounts payable not yet due and for paper issued by subsidiary companies for sold undelivered dock stock coal.

**Mining Plants**—Disposition of 77 mining plants owned at

the beginning of the year is as follows: In commission either the whole or part of the year, 51; available but idle for the year, 6; operated under leases, 7; exhausted and dismantled, 5; assigned to other mines, 8; total, 77. The possible tonnage capacity of the mines in commission for the year as against the actual output shows an efficiency percentage of only 65.36%.

**Pittsburgh Coal Dock & Wharf Co.—Guaranteed Bonds**—To secure funds to repay the Pittsburgh Coal Co. of Wisconsin for its advances on account of Dock No. 7 construction, to enlarge dock No. 5 at Superior, Wis., and to construct a dock at Lime Island, Mich., it became necessary to transfer the dock properties at the head of Lake Superior to the Pittsburgh Coal-Dock & Wharf Co. and to retire the \$1,852,000 outstanding bonds upon them as follows: Northwestern Coal Ry. Co., \$794,000; Ohio Coal Co., \$200,000; Pittsburgh Coal-Dock & Wharf Co., \$858,000. [Of these old bonds there remained outstanding on Dec. 31, 1912, \$121,000, \$85,000 and \$250,000, respectively.]

To do these things, an issue of bonds by the Pittsburgh Coal-Dock & Wharf Co. of Minnesota, guaranteed as to principal and interest by the Pittsburgh Coal Co. of Pennsylvania, was duly authorized in the sum of \$3,500,000, dated Apr. 1, 1912, bearing 5.4% interest payable semi-annually, with sinking fund provision for their retirement at or before maturity, Apr. 1, 1938, but redeemable all or any part on any interest date at 102½. Trustee, Union Trust Co. of Pittsburgh.

The large expenditures authorized will provide modern dock facilities sufficient for storing and handling an increase over present tonnage requirements, and for some time to come, at the head of Lake Superior. Decrease in handling costs, maintenance and rentals, heretofore paid, will exceed the increase in fixed charges created based upon the same tonnage.

**Midland Purchase Bonds**—The Midland Coal Co. lease of Jan. 1, 1903, upon 4736 acres of coal rights and of three mining plants taken over at that time was terminated by



sinking fund bonds of Pittsburgh Coal Co. of Pennsylvania, known as Midland purchase bonds, dated May 15, 1912, \$1,006,000 of which have been issued on the conveyance of the property, and the balance retained for the retirement of a prior lien mortgage of the Midland Coal Co.

**Monongahela River Consolidated Coal & Coke Co.**—While practically all of the preferred and about 94% of the common shares are held, this controlled company has been independently conducted, although, for economic reasons, a portion of the operating staff of both companies is joint and it had relatively an equal year in net gain with this company. Of the issue of debenture bonds exchanged for the preferred shares, \$57,500 have been acquired and canceled during the year, and we plan to retire annually hereafter such a percentage as will cancel the entire issue prior to maturity.

**Montour R.R. Extension—Bonds**—To insure maintenance of the present tonnage of the company, and to provide for its increase, it has become a present necessity to extend the Montour R.R. from its terminus at North Star, Penn., to the Millin Yards of the Bessemer & Lake Erie R.R. Co. by an extension of about 34 miles, to furnish an outlet for proposed new mine developments. A contract has been entered into between the Montour R.R. Co. and the Bessemer & Lake Erie R.R. Co., dated July 11, 1912, for a traffic exchange between the two railroad companies and a division of the rates upon it.

It is expected that the road will be in operation by July 1, 1914. To finance its cost, \$2,750,000 first mortgage 50-year 5% coupon bonds have been issued, free of deductible tax, and having an annual sinking fund provision sufficient to retire all before maturity on Feb. 1, 1962. Contracts have been let for the work. Current progress will also be made in the opening up of mines along the line of the projected road, with which all the railroads of the district can be connected. While the tonnage of this company will furnish a sufficient revenue to meet all charges, there are assurances of other traffic which would add greatly to the value of the new line.

#### RESULTS YEAR ENDING DEC. 31, INCLUDING SUBSIDIARY CO'S

	1912	1911	1909	1909
<b>*Production in short tons:</b>				
Pittsburgh district coal.....	16,948,775	14,739,158	16,213,912	14,560,331
Hocking district coal.....	1,414,642	1,281,517	1,267,914	1,005,437
Pittsburgh district coke.....	567,350	635,338	484,903	
Profits, after all expenses.....	\$4,427,036	\$4,044,504	\$4,699,863	\$3,448,394
Depletion of coal lands.....	714,306	696,181	777,285	697,968
Deprec. plant and equipment.....	811,251	867,595	901,089	927,870

Net profits.....	\$2,901,506	\$2,480,728	\$3,021,489	\$1,822,556
Interest on bonds.....	876,024	1,088,791	1,056,039	1,012,458
Preferred div. (5%).....	1,353,590	1,353,590	1,353,590	

Undivided profits.....	\$671,892	\$38,347	\$611,860	\$810,098
Surplus brought forward.....	8,841,541	8,443,194	7,831,333	7,021,235

Total surplus Dec. 31..... \$9,153,434 \$8,481,541 \$8,443,193 7,831,333  
\* Production includes sundry purchases from other producers and coal used in manufacture of coke.

#### CONSOLIDATED BALANCE SHEET DECEMBER 31

(Pittsburgh Coal Co. and Subsidiary companies.)

Assets—	1912	1911
Properties x.....	\$69,464,237	\$ 69,579,705
Treasury stock—pref. stock.....	4,928,200	4,928,200
Investment in stocks and bonds.....	16,525,240	15,877,627
Cash with trustees.....	1,206,350	32,142
Pension fund investments.....	86,243	86,243
Merchandise.....	3, 92,186	3, 80,930
Accounts and bills receivable.....	6,266,356	5,147,243
Cash.....	2,023,869	1,464,910
<b>Total.....</b>	<b>103,992,712</b>	<b>103,992,712</b>
Liabilities—	1912	1911
Preferred stock.....	\$2,000,000	\$32,000,000
Common stock.....	32,000,000	32,000,000
First mortgage bonds.....	9,205,000	10,084,000
Shaw coal purchase bonds.....	1,335,000	1,395,000
Debenture bonds.....	5,931,000	9,526,120
Subsidiary bonds.....	4,111,000	2,067,906
Maryland Coal Co. purchase bonds.....	1,006,000	
Maryland Coal Co. bonds.....	137,000	
Mortgages payable.....	315,498	178, 39
Car trust notes.....	260,000	364, 30
Pension fund.....	108,026	92, 29
Bills payable.....	2,675,255	4,465,414
Accounts payable.....	3,533,508	2,221,274
Stock purchase surplus.....	1,021,992	1,021,992
Insurance funds.....	175,000	175,000
Sales contingent fund.....	25,000	25,000
Undivided earnings.....	9,153,434	8,841,541
<b>Total.....</b>	<b>103,992,712</b>	<b>100,497,000</b>

x Properties owned Dec. 31, 1912, consisting of coal lands, mine plants and equipment, railways, railway cars, docks on Great Lakes, etc., were: Coal lands and real estate, less allowance for depletion of coal lands, \$56,086,903; plant and equipments, \$12,595,943; advanced royalties, \$7,388.

**Outlook**—The outlook for the present year is for a material increase in net earnings, against the adverse factors of an unusually light winter use and a reduced general business demand. Since 1907, due to special conditions, all costs have

steadily advanced, and the margin of gain has as steadily declined, until it is reasonable to expect an advance in the selling price of 1912, which did not represent the cost risk and value of the product.

## The Central Coal & Coke Co.

According to the recent statement of this company (of Kansas City, Mo.), it has over 30 coal shafts operating in Kansas, Missouri, Arkansas, Indian Territory and Wyoming, with timber mills in Texas and Louisiana. Gross income for 1912 shows a better proportion than for the 19 months ended Jan. 1, 1912, being \$1,265,279 to \$1,581,164 for the earlier period. Expense, interest and depreciation have decreased from \$1,086,577 for the 19 months before 1912 to \$633,770 for 1912. Net earnings for 1912 are \$631,508, against \$494,587 for preceding 19 months. The payments of 5% dividends upon the \$1,875,000 of preferred stock and of 6% upon the \$5,125,000 of common stock left a balance of \$230,259, compared with the balance of \$93,337 for the previous 19 months.

Out of assets of \$13,014,267, quick assets are \$2,431,730. Current liabilities are \$2,125,132, leaving a working capital of \$306,598. This compared with assets for the 19 months before of \$1,996,494 and liabilities of \$1,260,115, making a working capital of \$736,379. Decrease has been due largely to bills payable, which are \$547,500 larger for the shorter period.

## COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Apr. 12:

Stocks	Week's Range			Year's Range	
	High	Low	Last	High	Low
American Coal Products.....	87	87	87	87	87
American Coal Products Pref.....	109½	109½	109½	109½	109½
Colorado Fuel & Iron.....	35½	33½	34	41½	31
Colorado Fuel & Iron Pref.....			155	155	150
Consolidation Coal of Maryland.....	102½	102½	102½	102½	102½
Island Creek Coal Pref.....	86	85	85		
Lehigh Valley Coal Sales.....	225	210	210		
Pittsburgh Coal.....	85½	83	83	95	80½
Pittsburgh Coal Pref.....	23½	22	23½	28½	22
Pond Creek.....	168½	164½	166½	168½	152½
Reading.....	92½	92	92	92½	89½
Reading 1st Pref.....	95	93½	93½	95	87½
Reading 2nd Pref.....	50	50	50	54	44½
Virginia Iron, Coal & Coke.....					
Bonds	Closing Bid Asked		Week's Range or Last Sale	Year's Range	
Colo. F. & I. gen. s.f.g. 5s.....	97½	98½	98½ Apr. '13	98	99½
Colo. F. & I. gen. 6s.....	107½	107½	June '12		
Col. Ind. 1st & coll. 5s. gu.....	79½	81	80 Mar. '13	75½	85
Cons. Ind. Coal Me. 1st 5s.....	75	80	85 June '11		
Cons. Coal 1st and ref. 5s.....	94	93	93 Oct. '12		
Gr. Riv. Coal & C. 1st g 6s.....	100	102½	Apr. '06		
K. & H. C. & C. 1st s f 5s.....		98	Jan. '13	98	98
Poach. Con. Coll. 1st s f 5s.....	87	87½	Mar. '13	87½	87½
St. L. Rky. Mt. & Pac. 1st 5s.....	77	79	76 Mar. '13	76	80
Tenn. Coal gen. 5s.....	101½	102½	100½ Mar. '13	100½	103
Tenn. Div. 1st consol. 6s.....	101½	103½	101 Apr. '13	101	103
Cah. C. M. Co. 1st g 6s.....	104	110	102 Feb. '13	102	102
Utah Fuel 1st g 5s.....			Jan. '09		
Victor Fuel 1st s f 5s.....	83½	79½	Feb. '13	79½	79½
Va. I. Coal & Coke 1st g 5s.....	95	97	94½ Mar. '13	94½	98

**Consolidation Coal Co.**—Regular quarterly dividend of 1½% payable Apr. 30 to holders of record Apr. 15.

**Pacific Coast Co.**—Regular quarterly of 1½% on the common and second preferred and 1¼% on the first preferred payable May 1 to holders of record Apr. 18.

**Metropolitan Coal Co. (Boston)**—This company, controlled by the Consolidation Coal Co., has recently issued \$200,000 first mortgage 4½ per cent. bonds, dated Dec. 1, 1911. The issue is due Dec. 1, 1939, but callable at \$105 with interest for sinking fund beginning Oct. 1, 1913. The total authorized issue is \$250,000. The mortgage was made in connection with the purchase and development of the large coal plant of Geo. B. Emery, on the waterfront in Chelsea, it being proposed to build a 300-ft. pier and provide facilities for handling and storing 1,000,000 tons a year.

**Hocking Valley Products Co.**—This company was incorporated in West Virginia, February, 1911, as successors to the Columbus & Hocking Coal & Iron Co. and the Columbus & Hocking Clay & Brick Manufacturing Co., both of which were sold in foreclosure July, 1911. The authorized capital stock is \$4,600,000, having a par value of \$100. The annual sinking fund on bonds is at least 5c. per ton on coal, 15c. per barrel on oil and 25c. per 1000 on brick, and a further sum equal to the excess in dividends above 6 per cent.